BARBADOS

ANNUAL REPORT

OF THE

Department of Science and Agriculture

FOR THE YEAR

1948—1949

Advocate Co., Ltd.—Barbados.

COMMONWEALTH COLONIAL BUREAU
2 MAY 1950

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DEPARTMENT OF SCIENCE AND AGRICULTURE

STAFF

Director of Agriculture	S. J. Saint, C.M.G., O.B.E., M.Sc., Ph.D., F.R.I.C. (London).
Deputy Director of Agriculture	M. Halcrow, O.B.E., B.Sc., Dip. Agric. (Cantab), A.I.C.T.A.
Entomologist	R. W. E. Tucker, M.A., (Cantab), B.Ed. (Capetown).
Veterinary Officer	L. R. Hutson, B.V.Sc., D.V.Sc.
Botanist	D. M. Hanschell, B.Sc., A.I.C.T.A.
Chemist	J. B. D. Robinson, B.Sc., Agric. (Hons.)
Government Analyst	C. A. Coppin, B.A.Sc. (Toronto) A.R.I.C.
Senior Lecturer in Natural Sciences ..	F. A. Sweet, B.Sc., A.R.I.C.
Lecturer in Natural Sciences	V. A. A. Archer, B.S.A. (Mc Gill), M.S.A. (Toronto), F.C.I.C.
do. do. do.	F. N. A. Fields, B.Sc.
do. do. do.	R. D. Piggott, (Ag).
Extra Science Teacher	M. A. Maxwell
Plant Diseases Inspector	D. R. D. Wiles, D.I.C.T.A.
Principal Clerk	H. O. Ramsey
Senior Clerk	G. D. Ramsey
Clerk	A. S. Inniss
Clerk	C. B. Long
First Agricultural Assistant	C. B. Foster
Agricultural Assistant	H. E. Ward
do. do.	L. H. Atkinson
do. do.	W. M. Foster
do. do.	J. E. Clarke

Senior Peasant Agricultural Instructor ..	C. A. E. Beckles, D.I.C.T.A. (Ag.)
Peasant Agricultural Instructor	G. B. Pilgrim
do. do. do.	F. E. Bynoe
do. do. do.	L. T. Talma
do. do. do.	C. B. Cummins
do. do. do.	G. A. Ramsay
do. do. do.	C. D. Spooner
do. do. do.	E. S. Brathwaite
do. do. do.	F. M. Cummins
do. do. do.	V. F. Gay
do. do. do.	A. Yard
do. do. do.	E. G. St. John
do. do. do.	H. daC. Sealy
do. do. do.	C. V. Drayton
do. do. do.	C. A. Riley
do. do. do.	A. J. Bellamy
do. do. do.	J. E. Wason
do. do. do.	D. A. Corbin
Senior Analytical Assistant	H. A. Jones
Analytical Assistant	C. St. A. Alleyne
do. do.	L. A. Hall
do. do.	R. E. Barrow
do. do.	E. W. Maxwell
do. do.	K. H. C. Thorne
Entomological Assistant	W. Headley
Field Assistant	V. E. James
Government Laboratory Attendant ..	H. A. Wharton
Entomological Laboratory Attendant ..	A. Gittens
Foreman-in-Charge of Nurseries and Meteorological Station	T. O. Hoyte
Assistant Gardener	F. A. Jordan
Agricultural Department Messenger ..	G. Barker
Government Laboratory Messenger ..	L. H. Moore

COLONIAL DEVELOPMENT AND WELFARE SCHEMES

Scheme D. 217 — Agricultural Development

Senior Livestock Officer	A. G. MILL
Assistant Livestock Officer	A. D. HERBERT, D.I.C.T.A. (Seconded)
Co-operative Officer	J. M. CAVE, D.I.C.T.A.
Manager, Central Livestock Station ..	H. E. KIRTON
Overseer, do. do. do. ..	J. K. DRAYTON
Secretary, Barbados Dairy and Stock Breeders' Association	A. G. F. SEALE
Clerk, C. D. & W. Schemes	E. A. B. DEANE
Clerical Assistant	T. A. CRAWFORD
do. do.	F. B. TAYLOR

Scheme D. 235 — Experimental Cotton Spinning Plant

Manager	N. A. PHILLIPS
Overseer	A. HAYNES

Scheme D. 254 — Fishery Officer and Staff

Fishery Officer	D. W. WILES
Clerical and Travelling Assistant to Fishery Officer	O. E. MOSELEY
Clerk	E. F. OXLEY

Dr. Saint was absent from the Colony on eight days' duty leave from 3rd to 10th July to attend the opening of the Colonial Microbiological Research Institute in Trinidad as the representative of His Excellency the Governor.

Dr. Saint was also absent from the Colony on nine days' duty leave from 2nd to 10th January to attend the Conference of Directors of Agriculture of the B.W.I., the Academic Board of the I.C.T.A. and representatives of the U.C.W.I. held in Trinidad. During these periods Mr. M. Halcrow, Deputy Director of Agriculture, was appointed to act as Director of Agriculture.

Dr. L. R. Hutson was appointed to the newly created post of Veterinary Officer on the 1st August.

Mr. J. B. D. Robinson was appointed to the post of Chemist on the 7th October. He arrived in the Colony on the 20th October and assumed duty.

Mr. Coppin, Government Analyst, was granted fourteen days' special leave with effect from the 4th June in order to attend the Conference of Federated Civil Service Associations held in British Guiana.

Mr. Mill, Livestock Officer, was granted nine days' duty leave from the 18th January to visit Jamaica for the purpose of gathering all the information possible on the organisation and running of a Central Milk Depot. During his absence Mr. A. D. Herbert, Assistant Livestock Officer, was appointed to act as Livestock Officer.

Mr. D. W. Wiles, Fishery Officer, was granted eighteen days' duty leave from the 3rd August in order to attend the Conference of the United States Fisheries and Wildlife Service held at Miami, Fla.

Mr. F. E. Bynoe resigned the post of Peasant Agricultural Instructor on the 16th January.

Mr. K. H. C. Thorne resigned the post of Analytical Assistant on the 31st December.

Mr. M. A. Maxwell resigned the post of Extra Science Teacher on the 31st August.

BRITISH WEST INDIES CENTRAL SUGAR CANE BREEDING STATION

ADVISORY COMMITTEE

Chairman — S. J. Saint, C.M.G., O.B.E., M.Sc., Ph.D., F.R.I.C. (London), Director of Agriculture, Barbados.

Members — H. J. Page, O.B.E., B.Sc., F.R.I.C., F.I.R.I., Principal of the Imperial College of Tropical Agriculture, Trinidad.

— E. W. Leach, B.Sc., A.I.C.T.A., Director of Agriculture, Trinidad.

— A. E. Trotman, Dip. Agric. (Harper Adams), N.D.A., A.I.C.T.A., Director of Agriculture, Jamaica.

— H. H. Croucher, B.Sc., A.I.C.T.A., Director of Agriculture, British Guiana.

— R. B. Allnut, B.Sc., Director of Agriculture, Leeward Islands.

STAFF

Botanist — B. deL. Inniss, B.Sc., A.I.C.T.A.

Agricultural Assistant — N. L. Foster

„ C. D. Gilkes

Statistical Clerk E. L. Jones

Stenographer-Typist Miss S. O. Maxwell

BOARD OF AGRICULTURE

The members of the Board of Agriculture appointed for the Legislative Session 1948-49 were as follows :

The Hon. G. D. L. Pile, O.B.E., M.L.C., Chairman

„ „ J. D. Chandler, M.L.C.

H. A. Dowding, Esq., M.C.P.

E. L. Ward, Esq., M.C.P.

A. E. S. Lewis, Esq., M.C.P.

L. E. Smith, Esq., M.C.P.

F. E. C. Bethell, Esq., M.C.P.

H. A. Watson, Esq.

The Director of Agriculture is an *ex-officio* member of the Board.

REPORT ON THE WORK OF THE DEPARTMENT OF SCIENCE AND AGRICULTURE FOR THE YEAR ENDING 31ST MARCH 1949

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PART I.

SUMMARY OF AGRICULTURAL POLICY

1. The conservation of soil and the maintenance and improvement of soil fertility.

2. The control of pests and diseases of crops.

3. The improvement of crop yields by selection and breeding.

4. The maintenance of a sound animal husbandry industry as an integral part of the farming system.

5. The development and improvement of the Fishing Industry.

6. The encouragement of the production of local food crops, especially green vegetables.

7. The stimulation of co-operative ventures, particularly amongst small holders.

8. The development of irrigation in suitable areas.

PART II.

GENERAL

I. WEATHER CONDITIONS DURING THE YEAR

Detailed climatic data, as recorded at the Meteorological Station at Codrington, St. Michael, are given in Appendix I to this Report. Water is the principal factor limiting growth in Barbados and, as the water supply is almost entirely dependent on rainfall, the monthly average rainfall for the Colony is an important factor to record. The average rainfall for the period November 1947—January 1949, which covers the growing period of the plant cane, compared with the average rainfall for the two fifty-year periods 1847-1896 and 1897-1946 are set out in Table I.

TABLE I.

MONTH.	RAINFALL IN INCHES.		
	Average.		Average 1947-1949
	1847-1896	1897-1946	
November	7.93	7.64	2.70
December	4.86	4.75	2.28
January	3.65	3.10	3.01
February	2.28	1.94	1.30
March	1.82	2.06	2.83
April	2.51	2.16	0.57
May	3.60	2.78	2.91
June	5.59	5.02	5.15
July	5.99	6.43	9.54
August	7.60	6.92	10.34
September	7.74	7.57	11.72
October	8.29	7.24	7.49
November	7.93	7.64	10.53
December	4.86	4.75	4.42
January	3.65	3.10	1.20
Total ..	78.30	73.10	75.99

The average monthly rainfall figures for the Island for the fifteen months' period November 1947 to January 1949, when compared with the average figures for the previous two fifty-year averages, show that the rainfall was above average in total quantity but better distributed over the active growing months of June to December.

II. AGRICULTURAL CROPS

A. SUGAR CANE

(a) Production

The yield of sugar cane reaped during 1948 was the equivalent of 78,226 tons sugar only. This was made up of 56,496 tons Vacuum pan sugars, 1,262 tons Muscovado sugar, 6,754,420 wine gallons Fancy Molasses, which, equated on the basis of 330 wine gallons of Fancy molasses to the ton of sugar, is the equivalent of 20,468 tons sugar.

The rainfall for the fifteen month period November 1947 to January 1949 was satisfactory and well distributed. These favourable weather conditions

resulted in the production during 1949 being estimated at 153,000 tons sugar, so that the 1949 crop production is expected to be the second largest on record; the 1939 crop production was the equivalent of 156,443 tons sugar.

The sugar production in Barbados for the past six years is set out in Table II.

TABLE II.

Sugar Production for the Period 1943—1948

	1943	1944	1945	1946	1947	1948
Vacuum Pan sugar ..	132,031	82,819	98,120	111,933	86,369	56,496
Muscovado sugar ..	1,242	1,508	1,113	1,377	1,655	1,262
Fancy Molasses	—	20,175	20,215	20,410	23,208	20,468
	133,273	104,502	119,448	133,720	111,232	78,226

(b) Export of Sugar and Local Consumption

The colony's entire exportable surplus of sugar was purchased by the Ministry of Food. The export of sugar is still regulated by the Sugar Production and Export Control Board of which the Director of Agriculture is Chairman. Care is exercised to ensure that the requirements of the local market are provided for.

The position with regard to local consumption and export during the period September 1947 to August 1948 is as follows:—

	tons	tons
Estimated stocks in hand at 1st September, 1947:—		
Fancy molasses for export	5,996	
Sugar for export	19,626	
Sugar for local consumption	4,329	29,951
Production during 1948		78,226
		108,177
Estimated stocks in hand at 1st September, 1948:—		
Fancy molasses for export	6,875	
Sugar for export	2,823	
Sugar for local consumption	7,103	16,801
		91,376
Total exports, as per Customs returns, for the period:—		
Fancy molasses	18,883	
Sugar	61,835	80,718
Difference representing sugar left in the hands of merchants for local consumption		10,658

By the end of December, 1948, most of this sugar had been exported.

(c) Fancy Molasses

The Barbados Fancy Molasses Industry continues to be under the control of the Fancy Molasses Control and Marketing Board of which the Director of Agriculture is Chairman.

Little of the 1947 crop of Fancy molasses remained to be shipped at the end of December, 1947. The Fancy Molasses Control and Marketing Board allocated some 61,000 puncheons for production during 1948 for export. Of this quantity, some 19,000 puncheons were manufactured by small fancy molasses plants and the remainder by vacuum pan factories.

The quantity of fancy molasses which the importing markets are expected to require out of the 1949 crop production is in the vicinity of 49,000 puncheons. This figure is well below that of recent years. The reduced demand on the part of importers is associated with the general tendency for prices of all primary products to fall. Importers are therefore only prepared to purchase definite requirements.

(d) The Special Funds for the Benefit of the Sugar Industry and the Welfare of the workers

As was done in respect of the 1947 crop sugars purchased by the Ministry of Food, a sum of £2. 15s. per ton was included in the price for 1948 crop sugars to the paid into the following funds at the rates shown:—

Sugar Industry Rehabilitation Reserve Fund ..	20/- per ton
Sugar Industry Price Stabilisation Reserve Fund ..	25/- „ „
Labour Welfare Fund	10/- „ „

The Sugar Industry Rehabilitation Reserve Fund continues to be administered by the Sugar Industry Capital Rehabilitation Reserve Board, of which the Director of Agriculture is Chairman. The major portion of the funds collected has been paid out in accordance with Regulations made under the principal Act.

The Sugar Industry Price Stabilisation Reserve Fund is administered by the Sugar Industry Price Stabilisation Reserve Board, of which the Director of Agriculture is Chairman. The amounts accruing to this fund have been deposited with one of the local banks and is earning interest. It is only intended to utilize these monies in the event of the price of sugar falling below an economical level.

The Labour Welfare Fund is administered by the Governor-in-Executive Committee.

The Legislature concurred in an Act entitled the Sugar Industry (Rehabilitation, Price Stabilisation and Labour Welfare) (Amendment) Act, 1949, which gives the authorities administering the special funds power to invest any monies which are temporarily surplus in trustee securities.

(e) Acreage under Cane

Under the Sugar Cane Census Act, 1937-31, it is compulsory for all landholders with more than ten acres of land to make a return to the Department of Agriculture showing the acres of cane, and the various varieties to be reaped during the ensuing crop season.

The result of the census for the 1949 crop is presented in Table III, together with the corresponding figures for the years 1940 to 1948, inclusive.

. As a result of the recent surveys the acreage of cane grown by smallholders is estimated at 7,000 acres.

TABLE III.

Acreage of Sugar Cane reaped in the years 1940-49

Year	ACREAGES							
	Plantations						Small Holders (estimated)	Total
	Plant Canes	First Ratoons	Second Ratoons	Third Ratoons	Fourth Ratoons	Fifth Ratoons		
1940	15,618.12	11,810.83	5,598.74	1,518.73	173.65	5.00	7,000	41,725.07
1941	14,059.36	11,846.46	6,580.47	1,942.74	237.05	5.00	7,000	41,671.08
1942	15,023.77	9,928.64	5,651.64	2,278.44	348.13	11.75	7,000	40,242.37
1943	15,374.95	10,004.44	3,629.84	1,235.49	293.74	6.86	7,000	37,545.32
1944	14,144.22	10,557.28	4,203.08	814.51	72.82	4.50	7,000	36,796.41
1945	14,551.53	9,744.58	4,756.20	865.70	52.02	1.34	7,000	36,971.37
1946	14,056.25	11,614.50	5,578.25	1,817.50	51.25	6.00	7,000	40,123.75
1947	13,365.25	11,569.00	6,501.00	1,771.50	257.25	2.25	7,000	40,466.25
1948	13,480.75	10,614.00	6,281.00	2,126.75	255.50	28.00	7,000	39,786.00
1949	13,869.56	10,911.46	5,249.99	2,090.72	370.49	33.00	7,000	39,705.22

The reduction of the acreage under sugar cane from the year 1942 onwards was due to the compulsory increased planting of provision crops under the Local Food Production (Defence) Control Order, 1942, No. 2.

(f) Variety Acreages

These were obtained from plantation returns of the variety acreages to be reaped each year. The variety percentages for all crops for the years 1940 to 1949 are presented in Table IV.

TABLE IV

Percentages of Acreages of Sugar Cane varieties recommended by the Department and other varieties reaped during the period 1940—49

Percentages of totals

Varieties	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
.2935 ..	43.01	45.66	42.45	20.95	4.73	1.94	0.68	0.26	0.23	0.09
.H. 10(12)	23.15	22.16	19.81	12.69	8.00	4.76	3.19	2.49	1.36	0.33
. 726 ..	19.48	17.33	15.64	9.58	4.79	2.95	2.02	1.26	0.70	0.15
.3013 ..	8.26	8.58	8.42	5.84	2.98	1.38	0.52	0.17	..	..
.3127 ..	2.20	3.30	3.33	..	..	..	..	..	..	..
Mixed & other varieties	390	2.97	2.90	3.45	3.79	1.58	1.08	0.63	0.31	0.28
.3439 ..	..	..	3.60	8.35	9.49	4.89	2.40	0.54	0.25	0.12
.37161 ..	..	..	1.48	26.77	48.69	62.65	74.52	83.83	90.00	92.76
.35187 ..	..	..	2.37	10.19	11.28	10.19	6.09	3.25	1.91	0.98
.35245 ..	..	..	..	1.85	2.06	1.60	0.67	0.13	..	..
.34104 ..	..	..	..	..	4.19	7.46	6.89	3.83	1.24	0.32
.4098 ..	..	..	..	0.33	..	0.33	1.56	3.00	3.43	4.14
.38155 ..	..	..	..	..	..	0.27	0.28	0.28	0.16	0.04
.41227 ..	..	..	..	..	..	..	0.06	0.08	0.06	0.14
.41211 ..	..	..	..	—	..	..	0.04	0.21	0.30	0.58
.40105 ..	..	..	..	—	..	..	..	0.02	0.05	0.05
.40102 ..	..	..	..	—	..	..	..	0.01	..	0.02
.37193 ..	..	..		..		..	..	0.01	..	..

It will be seen from the above Table that the nobilised seedling B.37161 has practically replaced the standard noble canes B.H.10 (12), B.2935 and B.726 and occupied 92.76 per cent. of the acreage reaped in 1949.

B. COTTON

The close season for cotton was again maintained at three months duration. Owing to an early announcement of a satisfactory price, the area planted to cotton increased to 721¾ acres. The yield was satisfactory when the weather conditions are taken into consideration.

No pink boll worm was observed in the field or ginnery although careful inspections were made.

C. FOOD CROPS

As in the war years, the acreage of food crops grown during the year was regulated by Notice served under the Local Food Production (Defence) Control Order. Owners of land were required to plant a minimum of twenty-six per cent. of their arable acreage in food crops, of which at least six per cent. was required to be 'thrown-out' land. The areas of the crops to be grown were as follows:—

'Preparation land' (20% of arable land)—	
Yams	46%
Sweet Potatoes	34%
Corn, eddoes, pulses etc. ..	20%
'Thrown-out land' (minimum of 6% of arable land)—	
Sweet Potatoes	100%

Weather conditions were excellent for all kinds of food crops and, in order to permit the harvesting of 'preparation' land potatoes, the Government dehydrating factory was operated over a period of some four and a half months, and a total of 30,000 bags of 100 lb of sweet potato meal were manufactured. This meal is being incorporated in the Balanced Animal Feed.

D. MINOR CROPS

The propagation and distribution of various types of citrus, avocado pear, dwarf coconuts, breadfruit, Barbados cherry, guava and other fruit trees was continued during the year. A 'follow-up' system was introduced to ensure that the trees were properly planted and established. Applications from peasants were screened by the Peasant Instructors before being accepted to ensure that there was sufficient space and soil for planting.

Trials have been continued with such crops as maize, sorghum, tomatoes, onions and groundnuts with the object of producing better yielding strains.

Experiments with fodder crops have also been continued in conjunction with the general programme for improving animal husbandry.

E. IRRIGATION

Experimental work on various types of overhead irrigation equipment and pumps has been carried out during the year. An oscillating pipe-line system has been worked successfully for two seasons with young potted sugar cane seedlings. In the field, these seedlings have been established with a multi-jet type of overhead irrigation which has proved most satisfactory. At the Central

Livestock Station a system of rotary sprayers has been installed with portable pipe lines which is capable of irrigating about ninety acres.

The Scheme for providing irrigation equipment to peasants, which is assisted by free grants from Development and Welfare funds, has been proceeded with as rapidly as possible. Considerable difficulty is still being experienced in obtaining equipment to implement this scheme owing to currency and supply shortages.

F. CYTOGENETICAL RESEARCH WITH SUGAR CANE

The introduction of new and improved varieties of sugar cane by the British West Indies Central Sugar Cane Breeding Station has made a notable contribution to the efficiency of the sugar industry. The system of cane breeding, which has been followed to date, is largely empirical and the Advisory Committee of the Station has felt, for some time, that the work should be supplemented by cytological studies of the various varieties and crosses. A scheme for the appointment of a Cytogeneticist and the provision of facilities for cytogenetical research has been prepared and submitted to the Secretary of State for the Colonies, with an application for a free Colonial Development and Welfare research grant. This scheme has now received the sanction of the Secretary of State, and a free grant of £18,000 has been provided for this work over a period of five years.

PART III.

SECTION 1.

PEASANT AGRICULTURE

BY

M. HALCROW, O.B.E.,
Deputy Director of Agriculture.

A. General Conditions During the Year

The Weather. As already indicated in the previous section the weather was, on the whole, very good indeed. Good rains left little to be desired during the main growing season, but the 'catch' crop season for minor crops such as tomatoes was a little late; it was also somewhat short owing to an exceptionally dry season during January to March, 1949. There were, however, very few complaints.

The Main Food Crops. Good crops were harvested of yams, sweet potatoes, cassava, corn, tree crops and, indeed, all food crops. It was a good year.

Sugar Cane. Until the exceptionally dry reaping season set in, it looked as if record crops would be reaped in all areas, but in the low rainfall areas the crops ripened very rapidly. Nevertheless the yields of both plant and ratoon cane were very good indeed throughout the low and intermediate rainfall areas, and extremely good in the high rainfall areas. The position is summed up in the yield data given below :—

Sugar Cane Delivered to all Factories in 1949.

Estates	*Peasants*	*Total*	*Peasants' Canes as Per Cent of Total*
(Tons)	(Tons)	(Tons)	
1,122,072	184,524	1,306,596	14.12

Average No. of Tons of Cane per Acre reaped in 1949.

	Area (Acres)	*Yield* (Tons)	*Average Yield per Acre* (Tons)
Estates	32,705	1,122,072	34.31
Peasants	7,000*	184,524	26.36

* Estimated

TABLE I.

Summary of Sugar Cane Yield Data 1940-49

Sugar Cane Delivered to all Factories.

Year	Total Crop (tons)				Average No. of tons per acre reaped	
	Estates	Peasants	Total	Peasants as per cent. of total	Estates	Peasants
1940 ..	791,731	101,294	893,025	11.35	22.80	14.47
1941 ..	807,489	101,977	909,466	11.21	23.29	14.57
1944 ..	766,661	117,956	884,617	13.33	25.73	16.85
1946 ..	946,345	158,537	1,104,882	14.35	28.57	22.65
1947 ..	866,662	122,443	989,105	12.38	25.89	17.49
1948 ..	641,044	77,211	718,255	10.75	19.50	11.03
1949 ..	1,122,072	184,524	1,306,596	14.12	34.31	26.36

In 1942, 1943 and 1945 the records were incomplete. Estates refer to holdings over ten acres in extent; peasants refer to holdings under ten acres, and the total has been estimated at 7,000 acres only instead of 7,700 as before.

Minor Crops. (a) *Groundnuts.* The area devoted to this crop was negligible owing to the fact that practically the entire crop failed in the previous year and most peasant growers were short of seed. The small plots that were grown did well, for example, at the District Agricultural Stations yields were at the rate of over a thousand pounds weight per acre of dried nuts in the shells.

(b) *Shallots.* The growers of seasonal shallots in St. Philip and elsewhere made strenuous efforts to recover from the previous year but planting material was scarce and, as a result, the area under shallots was below average. Good crops were reaped and, on the whole, the position was practically up to average by the end of the year. Alas, the exceptionally severe dry season was a further set-back to growers who had taken a chance on an additional crop and only the people with some irrigation managed to come out on the right side financially. Prices of green seasoning ranged from twenty-four cents to seventy-two cents, with an average of forty cents per lb. to the grower.

(c) *Cotton.* The Peasant Agricultural Instructors, in collaboration with the Plant Diseases Inspector and the Cotton Factory, made strenuous efforts at the beginning of the season to extend the area under cotton in the outlying parishes. That considerable success was attained is shown by the comparative figures given below. Unfortunately, the season was not favourable for cotton and rather disappointing results were obtained by the majority of the peasant growers, although at one of the Agricultural Stations one field of half an acre yielded at the rate of 1,100 lb. seed cotton per acre. The following data cover area and yield for the current season :—

	Area Grown in 1948-49	*Total Yield of Seed Cotton*	*Average Yield of Seed Cotton per Acre*	*Ginning Percentage*
	(Acres)	(lb.)	(lb.)	
Estates	140	45,319	323.7	25.6
Peasants	581	175,797	302.5	26.4
Total ..	721	221,116	306.7	

TABLE II.

Summary of Annual Data 1943 to 1949—Peasants Crop Only

Year	Total area of Peasants' plots of cotton (acre)	Total Yield of Seed Cotton (lb.)	Average Yield per Acre (lb.)
1943-44 ..	710.0	182,745	257
1944-45 ..	268.0	63,273	236
1945-46 ..	137.5	30,448	221
1946-47 ..	106.5	42,872	402
1947-48 ..	102.5	27,237	265
1948-49 ..	581.0	175,797	302

The price paid to peasant growers who sold their crop to the Cotton Factory as seed cotton was on the basis of eighteen cents per pound, delivered to the ginnery, plus the possibility of a bonus on the completion of all the sales. The quality of the one hundred and four bales of lint shipped to the Raw Cotton Commission in England has evidently been well received, according to our latest information, because only a very small number of the bales have suffered reductions from the top price of a dollar per pound.

(d) *Ginger.* As one would expect, ginger grown in the higher rainfall areas did well and yields were above average. A plot at Groves Agricultural Station yielded at the rate of 28,968 lb. mature green ginger per acre. There was no change in the local wholesale selling price which remained at about sixteen dollars per hundred pounds of green ginger. The local market for ginger was rather dull; it was not easy to sell except for delivery at the buyer's convenience.

(e) *Tobacco.* The area of tobacco was probably slightly higher than usual at about thirty acres, mainly located in Boscobel and parts of the parish of St. Lucy. Wholesale prices of dried leaf were lower than in the previous year. About thirty-six cents per pound was the average price to the grower, which was very much lower than in the previous year.

(f) *Tomatoes.* Although the 'catch' crop season for tomatoes was later than usual owing to the excellent rainy season that continued into December, the local tomato crop was good and supplies were plentiful during the months of February, March and April 1949. The variety "Bounty" that was introduced by the Department two years ago undoubtedly contributed to extending the range of the crop as compared with previous years when the main varieties planted for the dry season were "Marglobe" and "Early Prolific". Competition with tomatoes imported from the neighbouring islands caused considerable and rapid fluctuations in price from six cents per pound to sixteen cents per pound to the growers.

(g) *Cabbages.* As a result of the strenuous efforts of the Department to encourage cultivators to grow more cabbage (mainly the variety "Late Flat Dutch") in season, there was undoubtedly more local cabbage on the market this year than ever. Moreover, the quality early in the season, i.e. November and December 1948 and January 1949, was excellent. Later, however, the supply fell off rather quickly owing to the unusually dry dry-season. Prices remained about sixteen cents per pound to the growers.

(h) *Okras.* Seasonal crops were plentiful and the market was very dull. As a result prices received by growers in outlying districts were rather low, ranging from twelve cents to thirty cents per hundred pods, i.e. only about half what was received in the previous year.

(i) *Irrigated Vegetable Crops.* Despite the fact that the number of irrigated vegetable gardens is constantly being increased, the demand for vegetables always exceeded the supply except on one or two occasions, as for example at Christmas time when string beans were sold for six to eight cents per pound and some growers had pickings left on their hands. The following Table shows the prices in St. Michael in March 1949, but it must be remembered that wholesale prices to growers in St. Michael are rather above the average for the outlying districts.

TABLE III.

Crop	Prices to Growers	Retail Prices
*Sweet potatoes	$1.50 per 100 lb.	3c. per lb.
*Yams	$1.80 to $2.00 per 100 lb.	3c. „ „
*Eddoes	$2.64 to $3.00 „ „ „	4c. „ „
Beans, stringless	16c. per lb.	24c. „ „
Beet	14c. „ „	18–20c. „ „
Cabbage	18–20c. „ „	24c. „ „
Carrot	16c. „ „	20–24c. „ „
Cauliflower	20c. „ „	24–30c. „ „
Cucumber	6c. „ „	8–10c. „ „
Eggplant	12c. „ „	16c. „ „
Lettuce	— —	3– 4c. „ head
Marrows	6c. „ „	8c. „ lb.
Okras	48c. „ 100	3 pods for 2c.
Peppers	60c. „ „	3 peppers for 2c.
Pumpkins	6c. „ lb.	8c. per lb.
Shallot (green)	24c. „ „	30c. „ „
„ (dry heads) ..	48c. „ „	—
Tomatoes	10c. „ „	12–16c. „ „
Thyme	60c. „ „	84c. „ „

* Prices controlled by Regulation.

(j) *Tree Crops.* There was, on the whole, good crops of all the main tree crops and supplies were generally available in season on the market. Some prices at March 1949 are given below but these are considerably affected by supplies imported from neighbouring islands.

TABLE IV.

Tree Crop	Price to Growers in St. Michael	Retail Selling Price
Bananas	36c. per 100 (green)	3 for 2c.
Coconuts (water) ..	$5.50 per 100	6–8c. each
Limes	72c. „ „	1–2c. „
Mangoes	$3.00 „ „	4–5c. „
Pears (Avocado) ..	$4.00—$5.00 per 100	8c. „

Pests and Diseases. On the whole, cultivators had comparatively little trouble during the year. Apart from reports of slugs in the wetter districts, there were very few complaints of major importance.

Peasant Livestock and Animal Husbandry. The position has not changed much since the previous year, as far as peasant livestock are concerned. In the Bridgetown Public Market the number of cattle slaughtered during 1948 was the lowest on record. On the other hand, the number of calves slaughtered was slightly above the average for the years since 1942. The numbers of sheep, goats and pigs, predominantly peasants' stock, which were slaughtered in 1948 were greater than in the previous year, viz. :—

TABLE V.

No. of Animals Slaughtered in Bridgetown Public Market

Animals	1946	1947	1948
Cattle	3,395	2,756	2,089
Calves	679	603	690
Sheep	2,156	2,650	2,767
Goats	437	476	561
Pigs	4,415	5,430	6,708

There were few complaints about difficulties in obtaining supplies of Balanced Animal Feed, and of course fodder was plentiful. The Balanced Animal Feed was reduced in price in the middle of July 1948 from $6.25 per 100 lb. to $5.16 per 100 lb. The price of fodder, e.g. green cane tops sold in Bridgetown, ranged from thirty-six to forty-eight cents per 100 lb. in March 1949, to sixty cents per 100 lb. towards the end of April, 1949, but prices in the country districts were much below these.

According to the butchers, the quality of the pork now-a-days is a great improvement on what it was before the war; this is attributed to the use of improved boars available at the Department's Stud Centres.

The Peasants' Loan Bank. A spectacular increase in the utilisation of the Peasants' Loan Bank is not expected. It can be stated, however, that the Bank has continued to play a useful part in the agricultural life of the owner-occupier section of the peasant community. The rate of interest was reduced from five to three per cent. as from 1st June, 1948.

The following is a summary of the year's transactions submitted by the Manager of the Bank.

TABLE VI.

Statement on Loans made during the Year

	1946-47	1947-48	1948-49
Number of loans granted during the financial year 1st June to 31st May	446	435	430
Short term loan accounts opened during the previous financial year (for cultivation, manures, taxes) and still outstanding during current financial year	30	55	94
Long term loan accounts opened during the previous financial years (for re-payments of mortgages, purchase of livestock & irrigation) and still outstanding during current financial year	169	257	205
	645	747	729
Less extensions of loans included in (1) above	21	24	13
Total number of accounts on books during the financial year	624	723	716
Amount of loans advanced	$20 707.00	$25,809.00	$24,545.00

Land Values. There have been very few dealings in agricultural holdings. Three examples of sales effected during the year were (1) two roods and two perches in St. James for £68. 8. 4., (2) one acre in St. Lucy for £125. 0. 0., (3) one acre and thirty-two perches in St. George for £400. There was certainly no indication of any reduction in land values during the year.

Mechanisation. There has been little change in the position since last year as far as cultivation is concerned. An increasing number of peasants is, however, taking advantage of any facilities available for deep tillage, and at the same time many estate owners have shown themselves quite willing to assist approved applicants for contract ploughing by tractor. The example of one planter who has experienced numerous break-downs and heavy repair bills through undertaking contract ploughing on peasant holdings is a salutary warning that mechanisation by groups of peasants on a co-operative basis, which has been suggested at meetings from time to time, might be a highly speculative business under local conditions. Examples of charges for contract cultivations are given below :—

Sub-soil ploughing, 12–18″ deep, with cuts 18″ apart in Christ Church	$ 9.00 per acre
Sub-soil ploughing, 12–18″ deep, with cuts 18″ apart in St. Andrew & St. Philip	12.00 „
Sub-soil ploughing, 12–18″ deep, with cuts 24″ apart in St. Philip	6.00 „
Furrowing on contour, 5′ wide in St. Philip ..	9.00 „

Sub-soiling is a task that cannot be done by hand, but with ordinary cultivation and furrowing mechanisation means a saving of thirty to fifty per cent. as compared with manual labour.

Co-operation. In the absence of Co-operative Legislation, there are strictly speaking no co-operative societies in Barbados. However, during the past three years the Department has been teaching the people about it and, as it were, reconnoitering the ground for the development of the co-operative movement amongst the peasants.

The so-called Fertilizer Groups that were mentioned last year have been continued. There were thirty-three of these groups comprising six hundred and six members. The total fertilizer requirements of the groups for 1949 amounted to ninety-nine tons of nitrogenous fertilizer and twenty-six tons of muriate of potash. Allocations of fertilizers for the groups were satisfactorily arranged with the importers, but of necessity on a cash basis. It remains to be seen whether the advantages of group action are sufficient to keep the people together.

A rapid preliminary survey, taken at the end of June 1949, has revealed some idea of the actual state of these groups and the chances of their group activities being improved or extended. The following is a summary of the position at the end of June 1949:—

Two groups are highly organised, function actively and already provide other facilities for their members.

Four groups function well together for fertilizers and have definite possibilities for further development.

Three groups function only because the leader is a shop-keeper and he buys the fertilizer and sells it to members and non-members.

Three groups function indifferently, leaders being school teachers, but there is no bond between members.

Eleven groups in which there is absolutely no bond among the members, who remain only names on the leader's list. Some do not even know who is the leader. There is no chance of further development in these.

Nine groups that are too small to be considered groups at all and show no possibilities of further development.

One group has been absorbed into one of the two highly organised ones.

From this survey it appears that there are only six groups of the thirty-two which can be developed into active co-operative societies eventually, while twenty-six offer no immediate chance of further development. It is expected that legislation will be passed in the near future.

Marketing. During the period October 1948 to February 1949, the supply of ground provisions exceeded the demand and, as a result, there were times when there was difficulty in selling sweet potatoes particularly. However, the Government Cassava Factory undertook to buy sweet potatoes for processing and this successfully obviated any risk of growers losing money on the crop. As far as sugar cane was concerned, there were no complaints brought to our notice of any difficulty in disposing of the crop. Heavy rain caused severe damage to a number of bridges, especially in St. Peter and St. Lucy, but the dislocation to cane hauling was on the whole remarkably slight.

In short, there were no marketing difficulties. It is perhaps worth recording that no progress has been made in regard to the provision of vegetable market places in Bridgetown, although it is understood that the matter is being considered by the appropriate Committee of the Vestry of St. Michael.

Peasant Holding Competitions. The two competitions held in connection with the Agricultural Society's Annual Exhibition, namely (i) the Vegetable Gardens Competition, and (ii) the Peasant Holdings Competition, took place as usual. Judges for the competitions were the Deputy Director of Agriculture and three other senior officers of the Department. Sixty-two vegetable gardens and thirty-six peasant holdings were entered, respectively, for these two competitions.

The prize-winning entries in both these competitions were outstanding and, especially in the latter, the final marks were very close indeed. As a result of this keen rivalry the competitions were very interesting, and the judges task by no means easy.

B. The Work of the Department's Peasant Agricultural Extension Services

Staff. Mr. F. E. Bynoe, Peasant Agricultural Instructor in charge of the Home Agricultural Station, St. Philip, resigned as from January 16th to take up a position as manager of a sugar estate in St. Kitts.

Six additional Peasant Agricultural Instructors, namely Messrs H. daC. Sealy, C. V. Drayton, C. A. Riley, A. J. Bellamy, J. E. Wason, and D. Corbin were engaged on probation as from September 16th, 1948, and one more, namely E. L. Murray, was engaged on probation as from April 1st, 1949.

At the end of March, 1949, therefore, the staff consisted of one Senior Peasant Agricultural Instructor, ten Peasant Agricultural Instructors and seven Pupil Instructors.

Visits to Peasant Holdings. The six Peasant Agricultural Instructors in charge of Stations visited one thousand two hundred and thirty-eight holdings, while the five remaining Instructors visited three thousand nine hundred and fifteen holdings, making a total of five thousand one hundred and fifty-three holdings visited during the year, as compared with five thousand two hundred and fourteen in the previous year.

School Gardens. The Peasant Agricultural Instructors paid one hundred and fifty-eight visits to school gardens, giving advice to the teachers and instruction to the children as required.

One important step forward with respect to school gardens was taken in August 1948 through a very successful vacation course in practical school gardening for teachers. The course was arranged by the Senior Peasant Agricultural Instructor in collaboration with the Teacher of Gardening at Erdiston Teachers' Training College. Thirty-six teachers took the course, which was carried through in nine sessions from August 3rd to 7th. The beneficial effects of the course were soon evident in several school gardens in the following term.

The School Gardens Competition was continued on the usual lines. Fifty-two school gardens were included for adjudication, which was carried out once a term by a panel of judges comprising the Deputy Director of Agriculture, the Plant Diseases Inspector and the Senior Peasant Agricultural Instructor. The generally high standard of achievement was maintained.

Meetings. The extension staff organised twenty-nine meetings of various kinds. In addition, a comprehensive programme of Peasant Farmers' Days was carried through, one at each of the six District Agricultural Stations. The meetings were well attended by audiences varying in numbers from two hundred to seven hundred. This was the second year for these Peasant Farmers' Days, which are now firmly established as an excellent feature of the Department's extension work.

Judging Rings. On account of shortage of staff mainly, but for other reasons too, our work in regard to attracting the young people, including adolescents, to take an interest in modern methods of farming has been slow. However, a feature of the year under review has been the formation by Peasant Agricultural Instructors of Judging Rings of young men and women on dairy cattle and mutton sheep. The highlight of this aspect of our extension work was the island-wide Judging Ring Rally which was held on 19th May, 1949, at the Glebe, St. George. Ten teams each of three young people from ten parishes took part in what was generally agreed to be a well organised and highly successful function. The development of this work, which is important, made heavy demands on the initiative and leisure time of the Peasant Instructors.

Soil Conservation. Advisory work was carried out on eighteen holdings in connection with soil conservation. Several of the Instructors were also in demand for similar work on plantations, until the appointment of a Soil Chemist, who normally deals with such advisory work on estates. Some extremely heavy rain storms during the year showed up the advantages to be gained by contour methods of cultivation and convinced many planters of the urgent need for adopting such methods.

Irrigation. The Colonial Development and Welfare Scheme for assisting peasants to develop irrigation was continued somewhat slowly, for two reasons,

(a) difficulty in obtaining equipment, mainly pipe and the larger (12 ft.) size of windmill pumping units, and (b) lack of funds on the part of the peasants due to the very poor crop season in 1947-48.

An interesting feature of the scheme was the increase in the number of peasants who expressed a desire to go in for overhead irrigation, based on little gasolene engine-driven centrifugal pumps mounted on water wells from fifteen to twenty-five feet deep in the sheet water area. Sometimes these engine-driven pumps were included as an addition to a windmill in case of light winds, and sometimes in place of a windmill. The engine pumping unit for a small garden worked out cheaper than a windmill, as the following examples of costings show:—

(a) Detailed cost of 6′ diameter windmill unit on an existing well twenty feet deep for quarter acre of garden ground.

6′ windmill on 40 ft. steel tower	$218.27
3¾″ brass cylinder pump	25.83
30′ rod	3.54
34 ft. 3 ins. of 2″ pipe	24.66
500 gallon storage tank and fittings	51.00
Miscellaneous charges, including freight	11.00
Engineer's account for installing	142.00
Total cost	$476.30

This outfit pumped seven hundred and twenty gallons of water per hour in average wind conditions into the storage tank ten feet above ground level, whence the water flowed under gravity through pipes to a series of dipping tanks placed at intervals through the garden. Watering of the beds was done by hand with watering pots—a laborious process.

(b) Detailed cost of a simple overhead irrigation unit based on a three-quarter H.P. gasolene engine-driven centrifugal pump mounted at the top of an existing well twenty feet deep for quarter acre of garden ground.

Excavating, deepening & widening well	$ 41.24
Block stone, sand, cement	28.23
Erecting & plastering foundations, casting concrete platform for pump and erecting overhead system	27.00
Engine-driven pump with brass foot valve & shower	223.23
Eleven wallaba posts @ $1.80	19.80
Galvanised pipe—1¼″, 1″ and ¾″	45.78
Miscellaneous fittings, including nipples, tees, unions, hangers, valves &c.	33.35
Drilling & tapping holes for nozzles	5.28
Total cost	$423.91

This outfit sprayed water a distance of twenty-five feet on either side of the full length of the overhead line, i.e. a total width of fifty feet. The spray line was rotated by hand as required, but an oscilla-

tor could be installed for an additional cost of $42.00. The capacity of the pump was twenty-five gallons per minute against a total head of eighty feet. The running costs of this outfit were found to be about fifteen cents per hour (i.e. 12½c. for gasolene and approximately 2c. for oil, actually 14½c. in all).

It has been found in practice that this unit can in fact irrigate half an acre of garden ground at one time (or control about one acre of garden land altogether). In other words, at a pumping rate of between 1,200 and 1,500 Imperial gallons per hour over half an acre of land the cost of fuel and oil for irrigation by this means works out at about $1.12 per inch of artificial rain.

Supplementary irrigation to a total of possibly one hundred inches would be used by a skilled market gardener in St. Michael. Hence the fuel and oil costs on a half acre of garden land might be $112.00, which is a modest sum to invest against an almost assured income of $1,200.00 to $1,500.00 gross per annum from the sale of garden vegetables from half an acre.

In the circumstances, it is not surprising that the most progressive cultivators in certain localities are taking to overhead irrigation like ducks to water.

The progress of the scheme to date (30th June 1949) may be summarised as follows:—

Form of Assistance	Number
Windmill pumping units complete	32
Windmill units plus engine units complete	3
Engine-driven pumping units complete	3
Digging a well only	1
Pipe and overhead irrigation fittings only	4
Total	43

In addition, there are four cultivators who have dug their own wells and are awaiting the arrival of twelve foot diameter windmills long overdue from the United Kingdom. Also several people have been assisted by way of equipment at cost, i.e. without financial assistance.

The extent of the financial assistance provided from Colonial Development and Welfare funds may be summarised as follows:—

Total cost of forty-three individual irrigation schemes	$26,154.44
Amount deposited by applicants in cash ..	8,572.97
Amount borrowed through the Peasants' Loan Bank	4,787.34
Amount of free grants from C.D. & W. funds	12,794.13
Total	$26,154.44

The area of land controlled by the above units is about forty acres, mainly in intensive vegetable gardening. The figures indicate that the rate of progress shown in the previous year has been maintained. It must be admitted that

progress is slow, but on the other hand every endeavour has been made to develop individual schemes that will be a permanent and lasting asset to the people directly concerned and to the island.

As far as irrigation on estates is concerned, considerable reconnaisance work has been carried out during the year which may lead to practical results in the near future. Several planters have shown a genuine interest in the possibility of overhead irrigation for sugar cane in the low rainfall areas

Distribution of Planting Material. The system introduced last year whereby the Peasant Agricultural Instructors made regular routine inspections of plants issued to peasants from Codrington Botanical Station was continued with good results. It was found necessary during the year to extend the system so that the first inspection was made at the time when the peasant received his planting material. In this way it was possible to ensure that the plants were given a good start and established under the best possible conditions. The method of issuing planting material of Dwarf coconuts as seedlings instead of 'unhatched' nuts was adopted and resulted in a thirty per cent. increase in the number of trees raised.

The material issued from the Codrington nursery during the year was as follows:—

Kind	To peasants	To other Applicants
Orange	11	181
Grapefruit	18	51
Lime	26	218
Shaddock	4	27
Pomelo	—	17
Lemon	—	10
Mandarin	—	46
Avocado Pear	7	173
Breadfruit	—	31
Citron	—	1
Dwarf coconuts	1,180	3,156
Totals	1,246	3,911

The District Agricultural Stations. The extension services are based on six Agricultural Stations which are located so as to be representative of the areas that they serve. The Stations were established and are still financed under the Colonial Development and Welfare Act. The main points concerning the Stations may be summarised in the following Tables.

TABLE VII.

Station	Parish	Total Area (Ac.)	Arable Area (Ac.)	Date of Starting	
The Home ..	St. Philip ..	18.12	13.50	April	1944
Sayes Court	Christ Church	11.60	8.40	June	1944
Groves ..	St. George ..	20.10	14.00*	October	1944
Jerusalem ..	St. Peter ..	15.66	11.00	December	1944
Haggatts ..	St. Andrew ..	13.75	7.00	October	1944
Bullen ..	St. James ..	10.48	7.00	February	1945

* Half of the Groves Station is used by the British West Indies Central Sugar Cane Breeding Station.

TABLE VIII.

Annual Rainfall at the Stations

1948	The Home (ins.)	Sayes Court (ins.)	Groves (ins.)	Jerusalem (ins.)	Haggatts (ins.)	Bullen (ins.)
January ..	2.91	2.87	3.65	2.95	4.25	2.56
February	0.57	0.87	1.56	2.06	1.10	0.81
March ..	1.61	1.97	3.14	3.12	3.37	1.19
April ..	1.78	0.26	0.77	0.63	1.09	0.28
May ..	1.54	1.30	3.91	2.44	4.16	2.23
June ..	5.71	4.24	4.43	6.83	6.62	4.63
July ..	5.95	6.76	9.83	10.69	11.97	6.68
August ..	8.47	6.03	11.69	8.45	9.86	8.34
September	8.83	8.29	12.79	16.29	13.46	12.91
October ..	6.12	4.21	9.24	10.29	7.85	5.73
November	7.87	8.86	12.44	7.79	10.69	8.32
December	1.55	2.34	5.57	5.67	5.66	3.45
Total 1948	52.91	48.00	79.02	77.21	80.08	57.13
„ 1947	29.20	30.45	50.20	43.12	47.47	30.30
„ 1946	39.57	42.23	61.03	42.88	44.70	43.12

These rainfall figures speak for themselves. 1948 was the first good year for the Stations since they were started.

The activities at the Stations fall into two main branches (1) stud centres, and (2) demonstration holdings.

The Progress of the Stud Centres. The number of stud sires kept at the Stations varied slightly from time to time during the year, and the numbers given below include several young bulls that were only allowed limited use—they had to be used, however, to some extent to relieve the pressure on older bulls that were generally over-worked.

TABLE IX

No. of Sires standing at Stud at March 31st 1949.

Station	Bulls	Buck Goats	Ram Sheep	Boars	Total
The Home	3	2	1	2	8
Sayes Court ..	2	2	1	1	6
Groves	5	3	2	3	13
Jerusalem	4	2	1	3	10
Haggatts	2	1	1	1	5
Bullen	—	2	1	2	5
Total	(1)16	(2)12	(3)7	(4)12	47

(1) Guernsey 12, Jersey 2, Holstein 2.
(2) British Alpine, Saanen.
(3) Black Belly Mutton Sheep.
(4) Berkshire and Large Black types.

The fees for services remained the same as in the previous year, namely bulls 72c., buck goats or ram sheep 18c., boars 48c. The number of services paid for at the six Stations during the year to March 31st, 1949 was as follows:-

TABLE X.

Number of Services Paid for in 1948-49

Station	Bulls	Buck Goats	Ram Sheep	Boars	Total
The Home	165	248	142	205	760
Sayes Court ..	110	210	76	116	512
Groves	702	421	228	350	1,701
Jerusalem	424	206	48	97	775
Haggatts	304	127	67	34	532
Bullen	—	115	29	57	201
Totals 1948-49	1,705	1,327	590	859	4,481

The above returns of services do not include free return services and services for the Station cows which, together, amounted to about five hundred services. Hence the establishment of sixteen bulls carried out at least 2,200 services, i.e. an average of 137 services per bull per annum. Although this appears to be over-working the bulls, the fact is that the conception rate appears to be under two services per conception, which is good by United Kingdom standards. This aspect of the work will be investigated in the coming year.

The Financial Returns of the Stud Services. As a result of the extremely detailed cost accounting methods used at the Stations, the cost of the stud services can be assessed accurately. The current returns confirm last year's results, namely that the services cost about three times as much as the revenue, viz :—

TABLE XI.

Cost of Upkeep of Stud Animals 1948-49

Bulls	The Home $	Sayes Court $	Groves $	Jerusalem $	Haggatts $	Bullen $	Total $
Cash (e.g. feed &c.)	272.09	377.08	602.60	503.48	312.07	—	2,067.32
Non-cash (e.g. fodder) ..	69.36	100.35	271.65	160.88	72.00	—	674.24
Labour (est.) ..	144.00	117.00	416.00	99.00	110.00	—	886.00
Total for Bulls	485.45	594.43	1,290.25	763.36	494.07	—	3,627.56
Bucks & Rams							
Cash	152.33	216.69	175.41	169.39	175.49	184.34	1,073.65
Non cash	14.35	35.29	77.45	27.56	20.00	29.23	203.88
Labour ..	35.00	44.00	160.00	23.00	69.00	111.00	442.00
Total for Rams & Bucks ..	201.68	295.98	412.86	219.95	264.49	324.57	1,719.53
Boars							
Cash ..	43.42	58.12	244.74	167.47	49.12	77.55	640.42
Non-cash	51.23	18.95	80.70	42.82	16.00	21.00	230.70
Labour ..	46.00	40.00	97.00	64.00	46.00	75.00	368.00
Total for Boars ..	140.65	117.07	422.44	274.29	111.12	173.55	1,239.12
Grand Total ..	827.78	1,007.48	2,125.55	1,257.60	869.68	498.12	6,586.21

TABLE XII.

Revenue from Service Fees 1948-49

	The Home. $	Sayes Court. $	Groves. $	Jerusa-lem. $	Haggatts. $	Bullen. $	Total. $
Bulls ..	105.12	67.68	447.84	331.92	258.48	..	1,211.04
Bucks and Rams ..	82.98	50.04	107.46	50.22	44.28	32.70	367.68
Boars ..	106.56	59.52	164.16	62.14	16.80	33.12	442.30
Total ..	294.66	177.24	719.46	444.28	319.56	65.82	2,021.02

This statement of revenue does not include any credit for pen manure.

As to whether the use of artificial insemination would solve the problem of the constant demand for more stud animals and at the same time reduce the cost of the stud centres, is a question that is now under consideration. It can be seen from the foregoing returns that the primary purpose of the Stations, namely the stud centres, was fully exploited during the year and that it was heavily subsidised.

The Demonstration Side of the District Agricultural Stations. The principle has been accepted by the Department—it almost amounts to a challenge —that the most convincing proof of our ability to advise farmers how to improve their methods, is to demonstrate that the methods are practical and that they definitely pay good dividends sooner or later. Hence experimental work is restricted to what can be done without unprofitable expenditure. We concentrate simply on managing the Stations efficiently as mixed farming holdings on the lines that would be recommended by the Department for owner-occupiers living in the areas served by the Stations.

TABLE XIII.

Various Data concerning the organization of the Stations during the year 1948-49

Area of Crops	The Home.	Sayes Court.	Groves.	Jerusa-lem.	Haggatts.	Bullen
Plant Cane (ac.)	2.90	2.00	1.50	2.00	..	1.50
First Ratoons (ac.) ..	..	..	1.43	2.00	6.50	1.50
Second „ (ac.) ..	..	..	1.50	..	..	..
Thrown-out for Sweet Potatoes & corn (ac.) ..	2.90	1.80	1.23	2.00	..	1.50
Thrown-out for a second year (ac.)	2.90 (cotton)	1.80 (cotton & cassava)	..	2.00 (cotton)	..	..
Preparation, i.e. Yams (ac.)	2.90	2.00	1.23	2.00	..	1.50
Garden Plot (ac.)	0.40	0.40	0.11	0.25	0.50	0.25
Miscellaneous, including experimental (ac.) ..	1.00	0.40	..	0.50	..	0.75
Foreman's Plot (ac.) ..	0.50	..	..	0.25	..	..
Total Arable Acres ..	13.50	8.40	7.00	11.00	7.00	7.00

TABLE XIV.

Some Crop Yields during the Year July 1948—June 1949, Calculated to a Per Acre Basis.

Crop	The Home	Sayes Court	Groves	Jerusalem	Haggatts	Bullen.
Plant Cane (tons)	26.16	30.85	49.66	36.72	..	34.86
First Ratoons (tons) ..	..	..	38.00	22.44	27.69	25.96
Second „ „ ..	..	..	32.66	..	..	..
Yams (lb.)	6,550	6,600	7,360	6,000	..	2,000
Sweet Potatoes (lb.) ..	8,200	5,880	15,200	8,666	..	4,300
Indian Corn (cut green) (tons)	21.30	..	..	..	..	..
Guinea Corn (cut green) (tons)	26.00	18.00	..	14.00	..	..
Cotton (seed cotton) (lb.) ..	532	1,100	..	600	..	..
Groundnuts (lb.)	..	560	800	..	..	..
Cassava (sweet) (lb). ..	..	..	..	4,200	..	7,000
„ (bitter) (lb.) ..	..	12,010	..	..	..	..
Cabbages (lb.)	..	..	12,000	..	..	..

In addition to the main crops, there was in every case a number of minor crops, including inter-planted crops, okras, tomatoes, cucumbers, the produce from the vegetable gardens, and fodder from the edges of fields and rab-land, and so forth, all of which helped to improve the economy of the Stations. Only Sayes Court had irrigation on a field scale from a small windmill, but this was relatively insignificant. By the end of the year, however, irrigation equipment was completed at Jerusalem, so that the economy of the Jerusalem Station should be greatly changed next year. At the other four Stations the vegetable gardens were watered as required from the Waterworks domestic supply. Equipment for the irrigation schemes at Bullen, Sayes Court and The Home has arrived in the Colony and all these Stations should be under irrigation next year.

The livestock at the Stations comprised, in addition to stud animals, dairy cows and breeding sows as part of the mixed farming set-up. The average establishment of livestock at each Station is set out in the following Table:—

TABLE XV.

Livestock Establishment at March 31st, 1949

Livestock	The Home	Sayes Court	Groves	Jerusalem	Haggatts	Bullen
Stud Animals ..	8	6	13	10	5	5
Cows	6	5	6	4	1	2
Calves	1	2	2	2	—	—
Milch Goats ..	1	—	—	1	1	2
Goat Kids ..	5	—	—	—	—	3
Sows	3	4	3	4	2	2
Donkey & Mules	1	1	1	2	1	1
Total No. Stock	25	18	25	23	10	15

At Groves and Sayes Court the milk was sold to schools, while Jerusalem and The Home had small retail milk rounds. Haggatts and Bullen have not

been arranged for dairying at all up to the present. All the Stations raised young pigs for sale to the peasants and planters. The record for the year was as follows:—

Young Pigs Raised During the Year

	The Home	Sayes Court	Groves	Jeru-salem	Haggatts	Bullen	Total
No. of Sows	3	4	3	4	2	2	18
No. of Weaners raised ..	23	50	47	65	27	38	250

The Financial Returns of the Demonstration Side of the Stations. The accounting system at the Stations has been most carefully designed, not only to give an accurate over-all account of the profit and loss, but also to enable cost accounting of the various branches of the agriculture to be carried out easily. Entries fall into three main types of items:—

(a) Actual expenditure on feeding stuffs, fertilizers, farm requisites and the like.

(b) Actual expenditure on labour, which does not include the salaries of the Peasant Agricultural Instructors in charge of the Stations.

(c) Book entries relative to the produce of the Stations used on the Stations, e.g. Guinea corn, yams, sweet potatoes (including vines), cane tops and so on fed to the stock, and pen manure applied to particular crops.

As far as the detailed cost accounting of particular crops or branches of the mixed farming system is concerned, it is obvious that the information has a limited application, but it is extremely useful in planning the development programmes of the Stations to suit local conditions. For the purposes of this Annual Report, however, it will suffice to summarise the financial results of the six Stations together, as follows:—

Statement of Revenue and Expenditure for the Year 1st July, 1948 to 30th June, 1949

Expenditure :

Total expenses for the six Stations $28,934.84

Revenue :

Actual receipts brought to account for the six Stations 20,689.39

N.B. (i) These figures include revenue from stud service fees and actual expenditure on the stud centres.

(ii) Salaries of the Agricultural Instructors in charge of the Stations and depreciation, if any, have not been included in the expenditure.

The results of the year's working has fallen short of our hopes but, on the whole, we have gone a long way towards achieving our objective, namely to make the Stations self-supporting. It may be as well to put on record some of the factors that have affected the financial returns.

Factors affecting the Financial Returns of the Stations

(1) As already indicated the stud centres have been run at a considerable loss which, however, is regarded as a justifiable form of assistance to the livestock industry of the island.

(2) The Stations were undoubtedly over-stocked with breeding sows. This fact was obvious in the past but the demand for good quality weaners was so great that every effort has been made to maintain production even at a loss, which can be looked upon as another form of assistance to the livestock industry of the island.

(3) The quality of the dairy cattle at the district Stations falls very far short of the requirements because the best of the stock were removed to the Central Livestock Station to form the foundation herd there. This is a matter that will be corrected in due course, but in the meantime two sides of the question have affected the financial returns, namely, unproductive expenditure on low producers and money invested in raising selected heifers.

(4) The methods of feeding all the livestock on the Stations have yet to be put on a thoroughly scientific basis for maximum economy. This aspect of the work is being co-ordinated with the results of analyses and feeding trials now being carried on by the Agricultural Chemist and the Livestock Officer at the Central Station.

(5) Soil fertility at most of the Stations was extremely low at the start and is now being built up by careful cultivation and manuring.

(6) Although field experiments are restricted to a minimum, there was some investment of money on trials and demonstrations. Here again it is considered that this factor contributing to the increased expenditure on the Stations is easily justified. For example, we have proved conclusively that the Virginia Bunch variety is better than the local variety of groundnuts. Moreover, the Peasant Farmers' Days, which inevitably mean some additional expenditure, have undoubtedly done good on the extension side.

General. The Senior Peasant Agricultural Instructor and the Peasant Agricultural Instructors have worked extremely hard throughout the year. The spade work in connection with developing the activities for young people frequently involved working late in the evenings after the usual day's work but there were no complaints. It can truly be said that we have pulled together with a real team spirit—which is as it should be.

SECTION II.

SUGAR CANE BREEDING AND SEEDLING TESTING

By

B. DeL. INNISS

Botanist, B.W.I. Central Sugar Cane Breeding Station

Sugar Cane Breeding — B.51′ and B.s.50′ Series

The usual methods were employed in the controlled crossing of various sugar cane varieties at Groves Agricultural Station from October 1948 to January 1949. The season was normal and arrowing was heavy. One hundred and seven crosses were obtained. Germination was very good on the whole but, as always happens, some crosses proved to be incompatible and failed to produce viable seed. It is estimated that over one hundred and twenty-six thousand seedlings were obtained, of which about thirty-five thousand were potted and thirty thousand survived.

Table I gives, under group heads, a list of the crosses made, the number of seedlings germinated, potted, planted in the Field Nursery and in the B.s.50′ First Year Seedling Trial.

TABLE I.

Numbers of Crosses and Seedlings in each group germinated, potted and planted in the Field Nursery B.51′ Series and the First Year Seedling Trial B.s. 50′ Series

Group	No. of Crosses	No. Germinated	No. Potted	No. Planted in Field Nursery	No. planted in First Year Trial
S. officinarum x S. spontaneum					
Dacca nobilisation	1	800	200	160	—
Glagah nobilisations	3	6,040	190	169	—
S. officinarum x S. barberi					
Chunnee nobilisation	1	300	300	175	—
S. officinarum x S. robustum					
Robustum nobilisations	2	500	500	357	—
S. officinarum x S. sinense					
Sinense nobilisations	2	50	50	38	—
S. officinarum x S. barberi x S. spontaneum					
Noble x Chunnee x Local ..	12	8,621	4,119	3,159	299
Noble x Chunnee x Glagah ..	15	23,029	5,925	4,811	400
Noble x Celebes x Chunnee ..	2	6,100	450	421	—
Noble x Local x Chunnee x Glagah	32	44,360	13,190	9,328	1,562
Noble x Chunnee x Glagah x Celebes	5	3,630	1,470	1,275	—
Noble x Chunnee x Local x Celebes	4	6,420	1,120	884	200
Noble x Chunnee x Glagah x Local x Celebes	2	3,300	600	557	—

TABLE I (*Cont'd.*)

Group	No. of Crosses	No. Germinated	No. Plotted	No. planted in Field Nursery	No. planted in First Year Trial
S. officinarum x S. spontaneum x S. spontaneum					
Noble x Local x Glagah	4	7,120	2,590	2,131	300
Noble x Glagah x Glagah ..	1	600	200	165	—
Noble x Glagah x Celebes ..	3	3,660	1,084	896	—
S. officinarum x S. barberi x S. spontaneum x S. sinense					
Noble x Chunnee x Glagah x Sinense	3	3,515	815	764	—
Noble x Chunnee x Glagah x Local x S. sinense	4	3,550	1,000	664	200
Noble x Chunnee x Local x Sinense	1	330	300	278	—
S. officinarum x S. spontaneum x S. sinense					
Noble x Glagah x Sinense ..	3	96	88	83	—
Noble x Glagah x Local x Sinense	1	3,560	190	183	—
S. officinarum x S. spontaneum x S. robustum					
Noble x Glagah x Robustum ..	2	400	250	204	—
S. officinarum x S. barberi x S. robustum					
Noble x Chunnee x Robustum ..	1	25	18	17	—
S. officinarum x S. barberi x S. spontaneum x S. robustum					
Noble x Chunnee x Local x Robustum	1	500	200	160	—
Noble x Chunnee x Local x Robustum	1	—	—	—	—
S. officinarum x S. barberi x S. sinense x S. spontaneum x S. robustum					
Noble x Chunnee x Glagah x Local x Sinense x Robustum	1				
Grand totals	107	126,506	34,849	26,879	2,961

Planting the First Year Seedling Trial—B.50′ Series

This series was bred in 1947, potted and planted in the Field Nursery in 1948 and from this into the First Year Seedling Trial in October 1948. Again, all seedlings considered to be too thin for commercial purposes were discarded at this stage as well as all that arrowed heavily, except the seedlings were required for breeding purposes only. This procedure greatly reduces the number of seedlings planted in the First Year Seedling Trial, and results in a great saving in time and labour during the crop season.

The numbers of crosses and seedlings in each group planted in the First Year Seedling Trial are given in Table II.

TABLE II.

Number of Crosses and Seedlings in each group planted in the First Year Seedling Trial, October 1948—B.50′ Series

Group	No. of Crosses	No. of Seedlings Planted in Trial
S. officinarum x S. spontaneum		
Noble x Local	1	180
Noble x Glagah x Celebes	1	56
S. officinarum x S. barberi		
Noble x Chunnee	1	120
S. officinarum x S. barberi x S. spontaneum		
Noble x Chunnee x Local	14	4,803
„ x „ x Local x Celebes	5	1,930
„ x „ x Glagah	3	220
„ x „ x Glagah x Celebes	4	605
„ x „ x Glagah x Local	19	1,955
„ x „ x Glagah x Local x Celebes	3	865
S. officinarum x S. spontaneum x S. sinense		
Noble x Glagah x Sinense	1	80
Noble x Glagah x Celebes x Sinense	1	90
S. officinarum x S. barberi x S. spontaneum x S. sinense		
Noble x Chunnee x Local x Sinense	1	40
Noble x Chunnee x Glagah x Sinense	1	102
Noble x Glagah x Local x Chunnee x Sinense	4	447
S. officinarum x S. spontaneum x S. sinense		
Noble x Glagah x Robustum	2	220
S. officinarum x S. barberi x S. robustum		
Noble x Chunnee x Robustum	1	63
S. officinarum x S. barberi x S. spontaneum x S. robustum		
Noble x Chunnee x Local x Robustum	2	271
Noble x Chunnee x Glagah x Local x Robustum	3	75
Totals	67	12,122

Results of Reaping the First Year Seedling Trials — B.s.49′ and B.49′ Series

These series of seedlings were bred in 1947 and 1946, respectively. The B.49′ series was planted in the Field Nursery in May 1947, and from this into the First Year Seedling Trial in November 1947, while the B.s.49′ Series was planted from pots into a short season First Year Seedling Trial in May 1948.

As in previous years, the seedlings were cut, cleaned, bundled and laid out for inspection. Selection was made initially on appearance, and later on the usual data obtained from each bundle.

Seventy-one selections were made from the B.s.49′ series and three hundred and thirty from the B.49′ series, making a total of four hundred and one altogether.

Tables III and IV give details of the field and final selections made from each cross in the B.49′ and B.s.49′ series, respectively.

TABLE III.

First Year Seedlings—B.49′ Series, Field and Final Selections

Cross	No. of Seedlings Reaped	No. Field Selected	% Field Selection	No. Finally Selected	% Final Selection
Ba.11569 x B.45181	150	16	11	5	3
B.3365 x B.34104	360	32	9	20	6
B.3439 x B.(30)L.7 ..	64	4	6	4	6
x B.37175	120	11	9	4	3
x B.37254	67	3	4	—	—
x B.39250	80	5	6	2	3
x Co.290	160	9	6	4	3
B.34102 x B.34104	110	10	9	6	5
x B.37193	107	6	6	5	5
x B.4098	240	23	10	16	8
B.34117 x B.43261	90	6	7	2	2
B.35197 x B.34104	204	25	12	12	6
x B.38279	173	4	2	1	—
x B.39178	100	7	7	3	3
x B.4543	25	—	—	—	—
x B.45116	15	3	20	1	7
x B.45184	160	17	11	10	6
x B.45236	60	2	3	2	3
B.35206 x P.O.J.2878 ..	55	7	13	6	11
B.35207 x B.34104	360	22	6	15	4
x B.40255	30	1	3	1	3
B.35218 x B.37261	7	1	14	—	—
x B.4098	95	8	8	7	7
x P.O.J.2878 ..	30	—	—	—	—
x C.P.36-134 ..	15	3	20	—	—
B.35247 x B.3337	149	13	9	6	4
x B.34104	330	31	9	14	4
x B.38279	82	10	12	1	1
x B.4098	100	10	10	7	7
x B.4306	120	11	9	3	3
x B.43214	150	6	4	4	3
x B.45283	12	—	—	—	—
x Co.281	86	—	—	—	—
B.37161 x B.3337	110	8	7	5	5
x B.34104	132	9	7	5	4
x B.4098	66	5	8	4	6
x B.4327	36	1	3	—	—
x B.45314	44	7	16	4	9
x B.43337	10	3	30	3	30
x B.43346	93	4	4	1	1
x B.4452	9	2	22	2	22
x Co.290	101	6	6	5	5
x P.O.J.2878 ..	161	11	7	9	6
B.37226 x B.43290	20	2	10	—	—
B.37227 x B.4098	130	11	8	8	6
B.37266 x B.34104	120	9	8	1	1
x B.37193	120	9	8	1	1
B.38203 x B.34104 ..	179	10	6	7	4
x B.39156	120	3	3	3	3
B.38233 x B.34104	440	24	5	9	2
x B.4098 ..	13	2	15	1	8
x 32 M.Q.629 ..	24	3	12	2	8
B.38272 x B.4098	90	9	10	3	3
B.39211 x B.45304	30	2	7	—	—
B.4092 x B.37193	26	8	31	6	23
B.40105 x B.37193	60	3	5	1	2

TABLE VII (*Cont'd.*)

Cross	No. of Seedlings Reaped	No. Field Selected	% Field Selection	No. Finally Selected	% Final Selection
B.40272 x B.34104	60	3	5	3	5
x B.4098	174	10	6	7	4
x B.43234	8	2	25	2	25
x Co.290	60	4	7	2	3
x Co.419	100	3	3	3	3
B.41227 x B.37193	120	11	9	4	3
B.42279 x B.37193	90	9	10	3	3
B.4362 x C.P.36—134 ..	10	2	20	—	—
B.43253 x B.39274	120	8	7	4	3
B.43283 x B.41227	140	19	13	15	11
B.43349 x B.37193	80	7	9	3	4
B.4450 x B.45315	10	—	—	—	—
B.4455 x B.4098	120	14	12	8	7
B.4457 x B.34104	140	7	5	3	2
x P.O.J.2878	50	2	4	1	2
B.44130 x Ba.6032	30	3	10	1	3
B.44233 x B.4098	120	13	11	4	3
B.4588 x B.4098	40	—	—	—	—
B.45102 x B.41242	90	3	3	—	—
B.45107 x B.40123	10	1	10	1	10
B.45117 x B.35269	56	3	5	1	2
B.45121 x B.(30)L.7 ..	81	3	4	1	1
B.45166 x B.3337	12	—	—	—	—
B.45170 x B.37261	18	—	—	—	—
B.45182 x B.34104	110	10	7	3	2
B.45186 x B.39156	18	—	—	—	—
B.45223 x B.4098	90	8	9	3	3
B.45258 x B.44234	15	4	27	2	13
B.45316 x B.37261	30	4	13	2	7
M.D.47 x B.4098	48	2	4	—	—
x B.45105	80	1	1	1	1
Co.421 x B.45237	120	14	12	8	7
x B.45301	120	8	7	2	2
C.P.36-158 x B.34104	100	8	8	2	2
Totals	8,510	643		330	

TABLE IV.

First Year Seedlings—B.s.49′ Series, Field and Final Selections

Cross	No. Planted	No. Field Selected	% Field Selection	No. Finally Selected	% Final Selection
B.3439 x B.40123	99	11	11	6	6
x B.45236	100	3	3	2	2
B.34102 x B.34104	97	5	5	1	1
B.35197 x B.34104	486	36	7	15	3
x B.4098	107	5	5	1	1
B.35247 x B.34104	413	19	5	9	2
x B.4098	207	6	3	1	1
B.35247 x B.41227	119	1	1	—	—
B.37161 x B.4098	500	54	11	23	5
B.38203 x B.34104	98	6	6	3	3
B.38233 x B.4098	92	3	3	—	—
B.45170 x B.4098	200	9	5	5	3
Co.421 x B.43290	196	8	4	3	2
x B.43375	200	12	6	2	1
Totals	2,914	178		71	

As a result of these trials, it was decided not to repeat any of the following crosses as the percentage number of seedlings selected from their progenies is not sufficiently large:—

B.3439 x B.37254
B.34117 x B.37261
B.35197 x B.38279
B.35197 x B.4543
B.35218 x B.37261
B.35218 x P.O.J.2878
x C.P.36–134
B.35247 x B.38279
B.35247 x Co.281
B.37161 x B.4327
x B.43346
B.37226 x B.43290
B.37266 x B.34104
x B.37193
B.39211 x B.45304
B.40105 x B.37193
B.4362 x C.P.36–134
B.4458 x B.4098
B.45102 x B.41242
B.45121 x B.(30)L.7
B.45182 x B.34104
M.D.47 x B.4098
x B.45105

Progress with Seedlings of the B.s.48′ and B.48′ Series.

The three hundred and ninety-nine seedlings of the B.s.48′ and B.48′ series were multiplied at Codrington and in October 1948 a minor selection was made, when the number was reduced to two hundred and forty-one. The selected seedlings were planted in the Central Cane Breeding Station Second Year Seedling Trials at the low rainfall station Codrington (2 trials) and in duplicate trials at the high rainfall stations Bowmanston and Hothersal. These trials will be reaped during the 1950 crop season. A short season trial with seedlings of the B.s.48′ series was also planted at Codrington under irrigation in April 1949.

Progress with Seedlings of the B.s.47′ and B.47′ Series.

The selected seedlings of these series were planted in the Central Sugar Cane Breeding Station Second Year Seedling Trials at the low rainfall station Codrington (2 trials) and in duplicate trials at the high rainfall stations Todds and Drax Hall in November 1947. These trials were reaped during the past year as plant canes, when forty-eight selections were made. Some of these will be tested further in Barbados, and in October 1949 they will be sent direct to the various contributing colonies for which they were selected.

The performances of the standard varieties and selected seedlings are given in Tables V and VI.

TABLE V

B.47' Series—Second Year Seedling Trials—Plant Canes

Estates : Codrington, reaped 2nd—7th February, 1949
Todds, reaped 22nd—25th March, 1949
(Figures represent the means of 3 plots of 9 stools each)

Variety	Parentage	No. of Canes (Rotten)		% Arrowing		Z.H.R. Brix		Weight Tons per acre	
		Codrington	Todds	Codrington	Todds	Codrington	Todds	Codrington	Todds
Group I									
B.37161 ..	Standard	102 (5)	130 (13)	5	17	21.7	21.8	35.04	49.54
B.4098 ..	„	141 (9)	143 (22)	4	70	21.9	21.6	47.71	48.86
B.s.4710 ..	B.35207 x P.O.J.2878	102 (7)	117 (12)	59	84	21.7	21.4	32.61	44.83
B.s.4711 ..	„ x „	117 (3)	116 (23)	3	36	21.7	21.9	40.42	45.89
B.s.4724 ..	B.35247 x B.3337 ..	145 (6)	164 (12)	7	12	20.9	21.9	32.93	46.37
B.s.4726 ..	B.38233 x B.34104 ..	122 (8)	131 (12)	31	71	21.5	21.5	34.75	42.43
Group II									
B.37161 ..	Standard	113 (11)	123 (14)	1	15	21.9	21.0	36.86	44.74
B.4098 ..	„	120 (4)	130 (22)	6	65	21.0	20.6	44.26	42.62
B.s.4733 ..	B.4145 x B.34104 ..	149 (12)	110 (10)	8	23	20.6	20.2	40.13	37.63
B.s.4738 ..	Co.421 x B.4098 ..	151 (9)	147 (25)	3	67	20.7	21.2	50.78	50.50
B.s.4743 ..	„ x „ ..	150 (9)	134 (16)	5	23	20.3	20.5	46.27	45.50
B.s.4744 ..	„ x „ ..	135 (6)	140 (20)	6	21	20.0	19.8	45.31	60.96
B.s.4746 ..	„ x B.41211 ..	166 (3)	145 (13)	7	20	21.7	21.7	39.36	48.96
B.s.4747 ..	„ x „ ..	172 (12)	154 (20)	12	23	19.0	20.5	49.63	51.65
Group III									
B.37161 ..	Standard	120 (9)	142 (17)	2	16	22.5	21.8	42.53	50.11
B.4098 ..	„	121 (8)	158 (12)	—	74	20.6	21.7	51.84	54.31
B.4755 ..	B.3365 x B.3337 ..	125 (10)	160 (25)	—	42	22.9	21.2	38.50	49.44
B.4764 ..	B.34102 x B.34104 ..	129 (13)	131 (10)	8	80	20.8	22.9	47.14	47.90
B.4765 ..	„ x „ ..	126 (8)	140 (12)	4	78	21.2	21.0	51.17	46.85
Group IV									
B.37161 ..	Standard	128 (8)	108 (7)	3	27	22.1	21.2	45.89	46.94
B.4098 ..	„	135 (6)	139 (18)	—	45	22.0	21.0	53.73	45.50
B.4781 ..	B.37161 x B.3337 ..	115 (11)	165 (12)	—	6	22.3	21.2	38.02	49.73
B.4788 ..	„ x B.4098 ..	118 (6)	143 (14)	3	66	21.2	21.7	46.46	46.94
B.4789 ..	B.40272 x B.37193 ..	137 (7)	94 (45)	—	28	21.9	20.5	48.96	29.28
Group V									
B.37161 ..	Standard	111 (6)	128 (11)	2	33	21.2	22.0	40.22	48.58
B.4098 ..	„	123 (5)	147 (12)	4	27	22.5	23.0	42.82	49.73
B.47112 ..	B.3354 x B.34104 ..	99 (4)	111 (23)	10	37	21.3	20.9	36.58	44.45
B.47135 ..	B.34102 x B.3337 ..	132 (4)	152 (4)	—	3	21.6	20.1	46.37	50.88
Group VI									
B.37161 ..	Standard	131 (7)	118 (17)	2	34	20.8	21.7	42.14	47.62
B.4098 ..	„	115 (9)	145 (21)	7	56	22.2	21.3	43.39	47.52
B.47147 ..	B.3354 x B.34104 ..	101 (10)	121 (17)	8	27	20.5	21.5	36.10	47.33
B.47151 ..	B.35197 x B.41227 ..	123 (10)	126 (20)	21	22	21.0	21.2	37.54	47.04
B.47162 ..	B.35207 x B.41211	156 (7)	158 (18)	3	26	22.7	22.1	46.46	44.83
B.47179 ..	B.35247 x B.3337 ..	150 (8)	173 (10)	20	51	20.6	20.0	46.85	50.98
Group VII									
B.37161 ..	Standard	99 (5)	133 (6)	2	32	20.8	20.1	38.98	45.79
B.4098 ..	„	119 (4)	133 (16)	7	61	22.7	22.1	46.94	48.67
B.47204 ..	B.35247 x Co.419 ..	125 (12)	133 (7)	18	39	20.5	20.8	46.18	45.22
B.47214 ..	B.37161 x B.4098 ..	100 (13)	131 (16)	2	7	20.7	20.2	38.88	52.97
Group VIII									
B.37161 ..	Standard	107 (6)	122 (8)	8	46	21.5	22.2	42.53	48.10
B.4098 ..	„	131 (9)	139 (9)	3	63	22.5	22.4	50.50	43.97
B.47225 ..	B.37161 x P.O.J.2878	112 (8)	138 (8)	31	76	22.6	22.6	43.87	41.47
B.47233 ..	„ x „	97 (26)	104 (20)	1	23	20.2	21.7	38.02	43.78
B.47294 ..	B.40272 x Co.290 ..	79 (28)	117 (19)	6	82	20.7	21.4	28.51	35.81

TABLE VI

B.47[f] Series — Second Year Seedlings — Plant Canes

Estates : Codrington—Reaped 1st—4th March, 1949
Drax Hall—Reaped 28th—31st March, 1949

(Figures represent the means of 3 plots of 9 stools each)

Variety	Parentage	No. of Canes (Rotten)		% Arrowing		Z. H. R Brix		Weight Tons per ac	
		Codrington	Drax Hall	Codrington	Drax Hall	Codrington	Drax Hall	Codrington	Dra Ha
Group IX									
B.37161 ..	Standard	117 (4)	129 (8)	9	70	20.6	21.8	40.42	41.6
B.4098 ..	„	127 (6)	136 (5)	—	73	20.9	23.5	48.19	44.5
B.47216 ..	B.37161 x B.4098 ..	103 (7)	127 (7)	2	3	19.7	23.2	39.65	43.6
B.47217 ..	„ x „	124 (12)	130 (13)	1	—	18.9	22.2	43.78	46.8
B.47256 ..	B.39254 x B.34104 ..	119 (4)	140 (6)	—	18	18.6	21.8	43.30	42.5
Group X									
B.37161 ..	Standard	105 (6)	113 (8)	5	34	20.3	22.5	41.28	37.3
B.4098 ..	„	127 (4)	146 (12)	4	68	21.0	24.2	51.94	42.6
B.7258 ..	B.39254 x B.34104 ..	127 (1)	146 (7)	6	14	21.3	24.2	46.85	43.6
B.47262 ..	B.4096 x B.3337 ..	114 (11)	149 (8)	8	48	19.4	21.3	44.54	40.6
B.47298 ..	B.41211 x B.34104 ..	124 (7)	130 (8)	3	2	20.2	23.0	39.92	41.2
Group XI									
B.37161 ..	Standard	105 (5)	149 (4)	—	46	19.6	21.7	41.09	43.0
B.4098 ..	„	117 (2)	150 (6)	5	44	20.2	22.9	47.81	44.4
B.47306 ..	Co.421 x B.34104 ..	133 (4)	160 (2)	14	45	18.7	21.8	42.72	42.7
B.47310 ..	„ x B.37193 ..	137 (1)	149 (2)	8	61	19.5	22.6	42.91	39.3
B.47312 ..	„ x „	125 (3)	152 (3)	3	54	17.9	21.1	47.12	39.9
B.47314 ..	„ x „	160 (3)	179 (1)	2	2	20.7	23.1	49.54	48.5
B.47320 ..	„ x B.41227 ..	138 (2)	139 (6)	47	62	20.0	21.4	39.46	35.5
Group XII									
B.37161 ..	Standard	125 (5)	118 (7)	6	58	20.0	22.6	49.06	42.0
B.4098 ..	„	116 (2)	140 (6)	2	76	20.5	23.8	47.04	41.8
B.47348 ..	B.34102 x B.34104 ..	129 (3)	134 (3)	5	31	16.4	22.9	49.73	37.8
Group XIII									
B.37161 ..	Standard	111 (3)	116 (4)	7	27	20.2	22.8	40.61	38.2
B.4098 ..	„	110 (3)	142 (6)	1	20	20.5	23.7	40.61	47.9
B.47361 ..	B.35207 x P.O.J.2878 ..	120 (4)	105 (12)	4	33	16.9	22.2	40.69	35.0
B.47364 ..	„ x „	122 (2)	122 (7)	1	23	18.7	21.9	38.02	38.6
B.47379 ..	B.37161 x B.4098 ..	120 (1)	137 (1)	1	2	18.7	22.2	50.78	49.8
Group XIV									
B.37161 ..	Standard	95 (3)	114 (6)	6	45	20.2	21.5	39.07	41.6
B.4098 ..	„	120 (2)	148 (7)	—	56	20.1	24.0	43.39	48.7
B.47380 ..	B.37161 x B.4098 ..	132 (5)	153 (10)	1	9	22.1	24.4	40.42	45.1
B.47386 ..	„ x „	123 (7)	138 (15)	11	77	20.6	22.4	41.92	34.8
B.47397 ..	B.40272 x B.37193 ..	105 (5)	170 (13)	—	18	19.6	21.8	38.21	48.7
B.47399 ..	„ x Co.290 ..	162 (6)	141 (9)	2	31	19.8	22.0	45.70	43.2
Group XV									
B.37161 ..	Standard	104 (1)	121 (3)	4	56	20.3	22.4	37.63	37.7
B.4098 ..	„	101 (1)	142 (11)	2	36	20.1	23.2	41.18	44.7
B.47410 ..	B.40272 x Co.290 ..	112 (5)	135 (13)	56	68	21.1	22.2	33.12	37.3
B.47419 ..	P.O.J.2878 x B.34104 ..	126 (8)	138 (8)	—	1	19.2	22.2	45.50	44.4

Progress with Seedlings of the B.46′ Series.

These seedlings were reaped in the Central Cane Breeding Station Second Year Seedling Trials as plant canes during the 1948 crop season. They were reaped as first ratoons at the high rainfall stations Pool and Colleton during the past year, when eight of the fifty-four selections were discarded on their ratoon performances. The outstanding seedlings in these trials would appear to be B.4691, B.46150, B.46223 and B.46397, but no forecast as to the probable outcome of any of these varieties can be made at present.

The seedlings of the B.46′ series which appeared to show most promise in Barbados were planted in Third Year Seedling Trials in November 1948. These will be cut as plant canes during the 1950 crop season.

The results obtained from the selected seedlings in these trials, together with the performances of the standard varieties, are presented in Tables VII and VIII.

TABLE VII

B.46′ Series — Second Year Seedling Trials — First Ratoons
Pool—reaped 11th, 12th & 13th April, 1949.
(Figures represent the means of 3 plots of 9 stools each)

Seedling	Parentage	No. of Canes (Rotten) Pool	% Arrowing Pool	Z.H.R. Brix Pool	Weight Tons per Acre Pool
Group I					
B.37161 ..	Standard	141 (8)	27	21.8	43.43
B.4098 ..	„	146 (8)	30	22.5	43.95
B.4604 ..	B.3354 x B.3337 ..	120 (9)	28	22.0	37.15
B.4608 ..	„ x Co.290 ..	128 (23)	42	21.6	42.91
Group II					
B.37161 ..	Standard	110 (4)	32	21.7	41.02
B.4098 ..	„	129 (3)	35	20.8	41.88
B.4642 ..	B.35197 x P.O.J.2878 ..	133 (17)	20	21.6	37.58
B.4645 ..	B.35206 x „ ..	131 (4)	25	20.8	31.91
B.4647 ..	„ x „ ..	147 (8)	7	20.9	41.28
Group III					
B.37161 ..	Standard	138 (8)	24	22.2	44.46
B.4098 ..	„	151 (9)	24	21.6	40.33
B.4659 ..	B.35218 x B.3337 ..	108 (13)	28	22.7	45.32
B.4668 ..	„ x B.37175 ..	101 (23)	10	21.5	30.62
Group IV					
B.37161 ..	Standard	146 (6)	47	22.0	42.57
B.4098 ..	„	162 (3)	44	22.6	46.78
B.4681 ..	B.35218 x P.O.J.2878 ..	116 (22)	1	23.3	36.46
B.4682 ..	„ x „ ..	144 (17)	17	22.0	33.71
B.4688 ..	B.35247 x B.3337 ..	113 (15)	23	19.6	40.25
B.4691 ..	„ x „ ..	170 (2)	30	22.4	55.13
B.4692 ..	„ x B.34104 ..	165 (13)	16	19.3	37.32
B.4699 ..	B.37161 x „ ..	163 (5)	67	21.7	37.93
B.46102 ..	„ x „ ..	125 (6)	10	22.5	43.95
B.46103 ..	„ x „ ..	139 (8)	—	23.5	49.36
Group V					
B.37161 ..	Standard	120 (3)	40	21.7	39.47
B.4098 ..	„	165 (4)	47	22.1	45.92
B.46105 ..	B.37161 x B.35187 ..	161 (7)	38	17.6	33.63
B.46113 ..	„ x B.40256 ..	110 (5)	5	20.8	33.97
B.46116 ..	„ x P.O.J.2878 ..	145 (13)	32	19.3	35.52

TABLE VII (*Concluded*)

Seedling	Parentage	No. of Canes (Rotten) Pool	% Arrowing Pool	Z.H.R. Brix Pool	Weight tons per acre Pool
Group VI					
B.37161 ..	Standard	134 (7)	49	21.7	42.74
B.4098 ..	„	187 (9)	25	22.0	44.46
B.46136 ..	B.37161 x P.O.J.2878 ..	84 (3)	35	21.6	34.31
B.46144 ..	B.38212 x B.34104 ..	125 (4)	30	21.8	39.90
B.46149 ..	B.4094 x B.3337 ..	106 (5)	10	22.7	36.98
B.46150 ..	„ x „ ..	227 (6)	9	22.8	51.43
B.46151 ..	B.4096 x B.35187 ..	134 (9)	17	22.2	38.27
Group VII					
B.37161 ..	Standard	158 (8)	41	22.2	48.23
B.4098 ..	„	184 (7)	33	22.3	51.51
B.46190 ..	B.3439 x B.37175 ..	158 (11)	34	20.8	43.86
B.46199 ..	„ x Pasoeroean ..	198 (9)	52	23.2	46.01
Group VIII					
B.37161 ..	Standard	146 (6)	63	22.4	42.48
B.4098 ..	„	158 (5)	67	23.3	41.28
B.46204 ..	B.3439 x P.O.J.2714 ..	164 (3)	27	22.7	39.90
B.46218 ..	B.34102 x B.3337 ..	145 (11)	52	23.1	46.96
B.46223 ..	B.34117 x P.O.J.2878 ..	159 (9)	—	22.5	53.15
B.46230 ..	B.35197 x B.34104 ..	136 (8)	55	21.4	35.35
B.46232 ..	„ x „ ..	168 (8)	17	21.0	44.63

TABLE VIII

B.46′ Series — Second Year Seedling Trials — First Ratoons
Colleton — reaped 17th, 18th & 21st March, 1949
(Figures represent the means of 3 plots of 9 stools each)

Seedling	Parentage	Colleton			
		No. of Canes (Rotten)	% Arrowing	Z.H.R. Brix	Weight Tons per Acre
Group IX					
B.37161 ..	Standard	142 (4)	19	22.1	44.20
B.4098 ..	„	140 (9)	29	22.5	44.55
B.46248 ..	B.35218 x B.4098 ..	126 (11)	15	21.6	33.54
Group X					
B.37161 ..	Standard	151 (7)	27	22.1	43.77
B.4098 ..	„	183 (7)	32	22.2	51.43
B.46265 ..	B.35247 x B.34104 ..	196 (9)	33	20.6	43.34
B.46281 ..	B.37161 x „ ..	119 (7)	3	22.2	40.33
B.46284 ..	„ x „ ..	185 (11)	—	22.1	48.07
Group XI					
B.37161 ..	Standard	124 (7)	22	22.6	40.08
B.4098 ..	„	148 (6)	19	21.7	46.10
B.46288 ..	B.37161 x B.40256 ..	128 (6)	19	21.0	41.45
B.46289 ..	„ x „	121 (3)	12	21.6	32.51
B.46290 ..	„ x „	149 (5)	45	21.7	43.69
B.46293 ..	B.37161 x P.O.J.2878 ..	131 (7)	11	21.5	36.03
B.46295 ..	„ x „	140 (5)	—	21.7	39.73
B.46297 ..	„ x „	103 (6)	3	22.3	32.85
Group XII					
B.37161 ..	Standard	182 (10)	20	21.8	51.43
B.4098 ..	„	153 (16)	28	21.9	43.34
B.46308 ..	B.37161 x P.O.J.2878 ..	153 (3)	32	22.6	43.43
B.46320 ..	B.40105 x B.37193 ..	131 (36)	9	20.6	34.40
B.46339 ..	B.34102 x B.34104 ..	170 (8)	—	22.6	48.16

TABLE VIII (*Concluded*)

Seedling	Parentage	COLLETON			
		No. of Cane (Rotten)	% Arrowing	Z.H.R. Brix	Weight Tons per Acre
Group XIII					
B.37161 ..	Standard	154 (8)	23	21.3	44.20
B.4098 ..	„	144 (12)	15	22.1	43.48
B.46340 ..	B.34102 x B.34104 ..	130 (4)	11	23.5	43.52
B.46351 ..	B.35206 x P.O.J.2878 ..	142 (4)	13	22.6	46.27
Group XIV					
B.37161 ..	Standard	126 (11)	25	22.1	42.70
B.4098 ..	„	145 (8)	54	22.0	46.10
B.46364 ..	B.35247 x B.3337	141 (9)	5	23.2	48.59
B.46369 ..	„ x „	148 (26)	19	20.1	48.33
B.46378 ..	„ x „	152 (9)	36	22.6	42.91
Group XV					
B.37161 ..	Standard	129 (4)	10	22.5	45.49
B.4098 ..	„	186 (5)	31	22.3	51.00
B.46391 ..	B.37161 x P.O.J.2878 ..	137 (4)	38	22.2	40.76
B.46394 ..	„ x „	132 (10)	3	23.2	36.38
B.46397 ..	B.4096 x B.35187 ..	174 (13)	—	23.1	58.14
B.46399 ..	B.40105 x B.37193 ..	140 (8)	4	21.3	30.36

Progress with Seedlings of the B.45′ Series

On account of severe fires during the 1947 crop season which burnt five trials at once, it was not possible to reap the Central Sugar Cane Breeding Station Second year Seedling Trial at Pool, and consequently selection had to be deferred until the ratoon crop was reaped during the 1948 crop season. The more outstanding seedlings of this half of the B.45′ series were planted in the Third Year Seedling Trials in November 1948 along with certain seedlings of the B.46′ series. These will be cut as plant canes in 1950. The seedlings which were selected at Bowmanston in 1947 were planted in Third Year Seedling Trials in November 1947, and these were cut as plant canes during the past crop season. Only one of the seedlings, B.45267, gave heavier yields than the standard varieties, and this was so trashy and difficult to cut that it cannot be considered as a commercial cane. Of the other seedlings tried B.45188 and B.45189 gave yields which were not far below those given by the standard varieties, but both arrowed heavily, particularly in the high rainfall areas. Both of these varieties had quite good juices. In the high rainfall areas B.45270 gave quite a good yield and had quite a good juice. It outyielded both of the standard varieties B.37161 and B.4098, but was in turn outyielded by B.41227 and B.43391, and would have been outyielded by B.41211 if the latter had not suffered from rat damage, particularly in one of the plots.

The seedlings of the B.45′ series, together with those of the B.46′ series were sent to the various contributing colonies during October 1948.

Progress with Seedlings of the B.44′ Series

The seedlings of this series were cut as plant canes during the 1948 crop season when only one, B.44341, appeared to be as good as the standard varieties. These trials with the exception of the one at Spring Hall which gave a poor spring and was ploughed out by the plantation, were cut as first ratoons during the past crop. B.44341 was most disappointing, giving yields which were in

most cases well below those of the standard varieties. B.4425 and B.4466 performed well in all cases, either outyielding the standard varieties, or being beaten by narrow margins. Both had quite good juices, but while B.4425 appeared to ripen at mid-crop or earlier, B.4466 appeared to ripen late in the crop, and in all trials the leaves were still very dark green when the canes were cut. B.4425 is an extremely clean cane, dropping its trash while still standing. B.4466 was difficult to clean during the 1948 crop, but gave little trouble during the past crop. This variety also gave the impression that it would welcome a longer active growing season than normally obtains in Barbados. B.4491 also gave some good yields of ratoon cane, but the canes are inclined to be thin and difficult to clean.

Progress with Seedlings of the B.43′ and Earlier Series

A. *The Seedlings Tested.*

Plant canes —B.37161, B.4098, B.41211, B.41227, B.43337, B.43391.

Second ratoons—B.34104, B.37161, B.4098, B.41211, B41227.

B. *An Ecological Classification of the Trials.*

This classification was proposed by Turner after a study of the sugar cane soils of the British West Indies and is based on the cultural requirements of the soils. It is as follows:—

Group I. Soils with a natural tilth and free drainage which require neither to be ploughed nor drained.

Group II. Soils with a tilth which can be improved by ploughing, but which do not require drainage.

(a) *Low Rainfall* :
Select Seedling Trials — Plant Canes — Mangrove.

(c) *High Rainfall* :
Select Seedling Trials — Plant Canes — Guinea.
Select Seedling Trials — Second Ratoons — Mt. Wilton, Lancaster.

Group III. Soils which require to be drained but are preferably left unploughed.

Group IV. Soils of a poor natural tilth in which a tilth can be created by ploughing, but which require to be drained to maintain their tilth.

Group II (a). *Mangrove — Plant Canes.*— In this trial, the variety B.41211 was outstanding, greatly and significantly outyielding all of the other varieties tried on yield of cane and sugar. B.43337 gave the next heaviest yield, closely followed by B.43391. However, the differences between the mean yields of these varieties and the yields given by B.37161 and B.4098 on both cane and sugar are too small to be significant. The variety B.4098 gave juice of the best sucrose content. There was little to choose between the juice qualities of the other varieties tried.

Group II (c). *Guinea—Plant Canes.* This trial was reaped very early in the crop season for a high rainfall station and none of the varieties were ripe. Juices were consequently very poor. There also appeared to be a marked variation in the fertility of various parts of the experimental site, as the yield variation from plot to plot was excessively high. B.41211 gave the heaviest yield of plant cane, followed by B.43391. There was nothing to choose between the average yields of B.37161 and B.41227, while B.43337 with the

lowest yield was very little below the last two mentioned varieties. The differences between the mean yields of the various varieties, although they were of the order of ten tons of cane per acre, just failed to be significant. B.41227 gave juice of the best quality, followed by B.37161, while B.43391 gave the poorest juice. B.41227 gave the heaviest yield of sugar, closely followed by B.41211, B.37161 and B.43391. B.43337 gave a yield of over one ton of sugar per acre less than any of the other varieties, but none of the mean yields of the various varieties can be shown to differ statistically.

Group II (c). *Lancaster and Mt. Wilton.—Second Ratoons.* In the trial at Lancaster, B.41227 gave the heaviest yield of second ratoon cane, and was significantly better than B.34104, B.37161 and B.41211, but not better than B.4098. B.34104, B.37161 and B.4098 proved to be significantly better than B.41211. B.41211 suffered severely from rat damage, while the plot nearest the road had been cut out completely by the labourers. B.34104 gave the juice of highest quality, closely followed by B.4098. B.41227 gave juice of the poorest quality but even this was very good.

At Mt. Wilton, B.41211 gave the heaviest yield of second ratoon cane, significantly and greatly exceeding all of the other varieties tried. This was followed by B.41227, which was significantly better than B.34104 and B.37161. B.4098 and B.34104 both proved to be significantly better than B.37161. There was little to choose between the juice qualities of any of the varieties tried, all of which were very good.

Summary and Conclusions

Generally speaking, the variety B.41211 has proved to be outstanding wherever it has been tried. As a plant cane it ripens fairly early, and once ripe will not stand for long without rotting. However, if it is cut very early in crop the juice quality is likely to be poor. As a ratoon it appears to ripen slightly later, and if not damaged by rats will stand until mid-crop or later.

B.41227 appears to favour the high and intermediate rainfall areas where arrowing is not a limiting factor. It has an excellent juice when ripe and appears to be at its best about mid-crop. Where heavy arrowing takes place, dry canes may be expected if the crop is left standing too long, as the arrowed canes do not produce side shoots to any extent.

B.43391 appears to favour the intermediate and particularly the high rainfall areas. It arrows very sparingly and ripens late in the crop. The canes trash easily, and ratoon very well indeed. The ratoon canes appear to be thicker and more uniform than the plant canes.

B.43337 appears to be at its best in the low and intermediate rainfall areas, where arrowing is not a limiting factor. In the high rainfall areas it arrows profusely and early, and this severely limits cane growth with a consequent drop in yield. It is a powerful ratooner, and appears to stand up to dry conditions very well.

Two of the seedlings of the B.44′ series appear to be about as good as the standard varieties B.37161 and B.4098, but unless these can maintain or improve on their performances in future trials they will not be recommended for commercial cultivation.

None of the B.45′ series which have so far been tried have shown any outstanding merit as plant canes.

Mosaic Disease Trials

The B.45′ series of seedlings was tested for resistance to mosaic disease during the year. Five one-eye cuttings of each variety were planted in twelve inch pots, and when they were about fifteen inches tall, were inoculated by the Sein method, using B.2935 material collected from the Mental Hospital many years ago. None of the seedlings showed disease symptoms after four months, and they were all then destroyed.

One hundred healthy Ba.11569 plants were inoculated at the same time to serve as a check and only ten of these showed disease symptoms.

The new suction technique was tried and this also gave about ten per cent. 'take'.

It would appear that the mosaic disease strain which has been kept in our isolation plot for many years has been losing its virulence, as the percentage number of 'takes' appears to be getting progressively smaller. It has recently been reported from Puerto Rico that the virulence of the virus is increased by passing it through sorghum, and this method is to be tried during the coming season.

In October 1948 the variety B.43391 was observed to be displaying leaf symptoms in the multiplication plots at Codrington which were suggestive of mosaic disease. The plots were immediately destroyed, and all cane at Codrington was inspected for mosaic disease. None was found. Plots of B.43391 growing on the plantations were also examined and were found to display similar symptoms. Over one hundred one-eye cuttings of healthy Ba.11569 were inoculated, using the suction and Sein techniques with the B.43391 material taken from Codrington. Ten weeks after the last inoculation was done none of the Ba.11569 plants had shown the disease, so it was concluded that the symptoms were not caused by the mosaic disease virus. In addition to this evidence, stools of B.43391, which were removed from Codrington to the isolation plot at the Office, grew and produced normal healthy green shoots.

BOTANY

BY

D. M. HANSCHELL,
Botanist.

Propagation and Distribution of Ornamental Plants.

The propagation and distribution of ornamental plants was continued during the year. The number of plants distributed is given in Table I.

TABLE I.

Year	No. of Orders	No. of Species	No. of Plants Distributed
1947—48 ..	154	26	13,090
1948—49 ..	204	26	4,945

A large number of these plants was supplied free of cost to other Government Departments, the remainder being sold to the public. The replanting of the ornamental wall garden at Codrington was continued, but the Department is still largely dependent on private gardens for obtaining plant material for propagation.

Distribution of Vegetable Seeds from the Department's Office

This distribution aims at encouraging the purchase of vegetable varieties which are known to be suited to local conditions. The Department purchases these seeds from reliable firms and sells them in small quantities at cost. The quantity of seeds distributed continues to increase, as shown in Table II.

TABLE II

Seed	Variety.	Amount — lb. 1947—48		1948—49	
Beans	Bountiful		5,880		**6,361**
„	Kentucky Wonder ..		70		10
„ , Lima ..	Fordhook		10		25
„ „	Ideal		5		20
Beet	Detroit Dark Red ..	180		180	
„	Early Blood Turnip ..	—	200	5	190
„	Eclipse	20		5	
Cabbage	Hastings Sure Crop ..	—		3	
„	Danish Ballhead ..	13	26	10½	26
„	Late Flat Dutch ..	5		3	
„	Wakefield Charleston ..	8		9½	
Cantaloupe ..	P.M.R. No. 45 ..		1		1½
Carrot	Chantenay	49		32	
„	Danvers	115	277	120	404
„	Oxheart	107		252	
„	New Imperator ..	6		..	

TABLE II(*Cont'd.*)

Seed	Variety	Amount — lb. 1947-48		1948-49	
Cauliflower ..	Sutton's Early Market ..		8		8
Cucumber ..	Henderson		3		18
Egg Plant ..	Black Beauty		1		3
Kohl Rabi ..	Extra Early White Vienna		3		5
Lettuce	Mignonette	39		52	
„	Black Seeded Simpson ..	13	52	12	64
Onion	Crystal White Wax ..	—		2	
„	Early Grano	—	—	½	2½
Parsley	Emerald		11		12
Pea, Black-eye	Dixie Queen		—		200
Pepper	Ruby King		—		1
Radish	Scarlet Globe		3		5½
Squash	Delicata		1		5
Swiss Chard ..	Lucullus		2		2½
Tomato	Bounty	—		5	
„	Early Chatham ..	—		5	
„	Extra Early Prolific ..	—	30	2	41
„	Marglobe	30		29	
Turnip	Purple Top White Globe		2		3¾
	Total ..		6,585		7,408

Propagation and Distribution of Economic Trees.

(a) *Citrus.* Eight types of citrus trees were propagated and distributed, i.e. lime, orange, grapefruit, shaddock, lemon, mandarin, pomelo and citron. The scion material consisted chiefly of budwood from local vigorous seedling trees and, to a less extent, of commercial varieties imported from Trinidad and established in the orchard at Codrington Experiment Station. The stock used was sour orange grown from seed imported from Trinidad.

During the year, a total of six hundred and ten budded citrus plants were distributed at a price of six cents to peasants and twenty-five cents to others (see Table III).

The system whereby no fruit trees are issued to peasants until the planting sites have been first inspected and approved by one of the Peasant Agricultural Instructors and the trees subsequently inspected at regular periodic intervals, was continued and has led to an improvement in the standard of cultivation.

A disease of seedling and budded limes appears to be increasing, and there were several cases reported during the year. The disease starts with the dying back of the young shoots, at first only a portion of the tree being affected. The die-back continues from the twigs back to the main branches, the bark of which is killed in strips. As more and more shoots are affected, the whole of the bark on the main branches is killed and eventually the main trunk. In budded trees the disease does not progress beyond the bud union and into the sour orange stock. It appears from the symptoms that this disease is very similar to one which is reported from Trinidad. The cause of this disease has not been determined.

(b) *Avocado Pear.* The propagation of budded avocado pears was discontinued and only seedling trees from selected parents were distributed. During the year one hundred and eighty pear seedlings were distributed.

(c) *Dwarf Coconuts.* Coconuts of the 'Dwarf' variety, which come into bearing in three to five years, were imported from St. Lucia and distributed. There was no falling off in the demand, and nine hundred and six hatched and three thousand four hundred and thirty unhatched nuts were distributed.

TABLE III

Distribution of Economic Trees

Species	Varieties	Total No. of Plants Delivered			
		1947—48		1948—49	
Citrus					
Citron	Trinidad	5		1	
Grapefruit ..	Foster, Duncan, Marsh, Walters, Claybury Nos. 1 & 2..	123		69	
Lemon	Claybury, Layne House ..	7		10	
Lime	Codrington, Claybury, Tahiti, Lisbon	164		244	
Mandarin ..	Dancy, Claybury Nos. 1, 2 & 3	57		46	
Orange	Tardiff, Parson Brown, Navel, Layne House Nos. 1 & 3, Ruby, Pineapple, Claybury Nos. 1, 2 & 3	249		192	
Pomelo	Codrington	14		17	
Shaddock ..	Burkes Village, Claybury Nos. 1 & 2	39	658	31	610
Avocado Pear	Selected seedlings		65		180
Miscellaneous:					
Breadfruit ..		48		31	
Barbados Cherry		19		10	
Fig		..		10	
Guava		58		109	
Grape		5		9	
Golden Apple ..		10		14	
Genip		..		4	
Grenadilla ..		..		2	
Pawpaw ..		38		58	
Sugar Apple ..		4		3	
Soursop ..		..		6	
Water Lemon ..		..	182	4	260
Dwarf Coconuts	906 hatched, 3,430 unhatched		1,857		4,336
	Total		2,762		5,386

Minor Crops.

(a) *Maize.* In addition to the multiplication and field selection of Barbados, Hawaii and Trinidad varieties of maize, a randomised block field experiment was carried out to determine the relative yields of dry matter and crude protein of maize, cut at different stages of growth. Six plots from experiment were cut at the following stages :—

I. On the appearance of the first tassels.
II. When the silks had dried.
III. When the grain was at the milk stage.
IV. When the grain was at the glazing stage.

Samples from each plot were analysed. The yields obtained and the results of the analyses of the samples are given in Tables IV and V.

TABLE IV

Maize Experiment — Yields — lb. per acre

Treatment	Age from Planting (Days)	Yield— Green Matter (lb. per ac.)	Yield— Dry Matter (lb. per ac.)	Yield— Crude Protein (lb. per ac.)
I ..	45	10,003	1,900	207
II ..	55	15,150	2,475	209
III ..	65	17,370	3,482	241
IV ..	70	15,665	3,994	266
Significant Differences		± 3983	± 1106	Differences not significant

TABLE V.

Maize Experiment — Analysis of Dry Matter

Treatment	Per Cent. Dry Matter of Fresh Material	Analysis of Dry Matter				
		% Ash	% Fibre	% Oil	% Protein	% Carbohydrate
I ..	17.64	9.18	25.04	0.53	11.35	53.89
II ..	16.32	6.78	24.72	1.12	8.64	58.72
III ..	20.01	6.04	25.05	0.88	6.97	61.03
IV ..	25.67	5.13	23.39	0.98	6.66	63.80

Significant difference Per Cent. Protein = ± 1.53 per cent.

(b) *Groundnuts.* Small randomised block field trials were carried out at Haggatts and Jerusalem Agricultural Stations. These were repetitions of those carried out last year with addition of the variety Virginia Bunch. The following varieties were included :—

1. Local Runner
2. Valencia
3. Spanish Bunch
4. Virginia Bunch.

Two spacings were employed, viz : (a) 12″ x 6″ and (b) 12″ x 12″.

The mean yields obtained in pounds per acre of *unshelled nuts as reaped* are given in Table VI.

TABLE VI.

Groundnut Yields—lb. per acre.

Variety	Haggatts Agricultural Station		
	12″ x 6″	12″ x 12″	Mean
Virginia Bunch	5,011	4,889	4,950
Local Runner	3,978	3,889	3,933
Spanish Bunch	1,632	1,299	1,465
Valencia	938	870	904
Mean	2,890	2,737	
	Jerusalem Agricultural Station		
Virginia Bunch	1,434	1,305	1,369
Local Runner	1,428	1,278	1,353
Valencia	931	510	720
Spanish Bunch	414	306	360
Mean	1,052	850	

Significant difference between Variety Mean Yields :—
Haggatts ± 1,197 lb. per acre.
Jerusalem ± 493 lb. per acre.

At both Stations Virginia Bunch and the Local variety gave significantly higher yields than the other two varieties. Virginia Bunch is considerably earlier than the local variety, is much easier to harvest and gives a better quality nut. At each Station the difference between the two spacings was not significant.

(c) *Tomatoes.* Six varieties were planted in a wet-season trial at Codrington Experiment Station. Mean yields from six plots of each variety are given in Table VII.

TABLE VII

Yield of Tomatoes — Planted June, reaped August — September

Variety	lb. per acre
Early Chatham	6,874
Pearl Harbour	4,805
Bounty	4,429
M 12 (Local Cross)	3,985
H.E.S. 823	2,800
Marglobe	1,574

In addition, four varieties of Turialba tomatoes from Costa Rica were grown in observation plots but proved complete failures.

(d) *Velvet Beans.* The following Velvet Bean varieties were grown in plots for multiplication and observation :—

1. Somerset
2. Smith
3. White Mauritius
4. Black Mauritius
5. Jubilac
6. Marbilee

} from Bureau of Sugar Experiment Stations — Queensland.

7. White Bush
8. Early Arlington
9. Tracy Black

} from U.S. Department of Agric.

10. 90-Day Speckled
11. No name

} from Florida Seed Company.

Growth of all varieties was satisfactory and fair quantities of seed were obtained.

(e) *Soya Beans.* The following varieties of Soya Bean, supplied by the U.S. Department of Agriculture, were grown for seed multiplication :—

1. Ogden
2. Acadian
3. Roanoke
4. Avoyelles (forage)
5. Mamotan
6. Seminole
7. Palmetto.

With the exception of Avoyelles, the growth of all varieties was poor and only small quantities of seed were obtained.

(f) *Cowpeas.* From twelve varieties supplied by the U.S. Department of Agriculture, the following five were selected for trials :—

1. Black
2. Brabham
3. Honolulu
4. New Era
5. Iron.

(g) *Sorghums.* Twenty-eight varieties of sorghum were planted in four trials. These varieties included short, medium and late season types. Due to the extensive damage by birds, no comparative yields were obtained, but from observation eighteen varieties were selected for further trial. Six additional varieties were grown in plots for seed multiplication.

Afforestation.

(a) *Distribution of Trees.* Five thousand three hundred and twenty-seven casuarina and three hundred mahogany trees in pots were distributed free of cost during the year.

(b) *Preservation of Trees Act.* It has been felt for some time that the present Act is unworkable and did not give any real encouragement to the planting of trees. A new Act has been drafted and is under consideration.

SECTION IV

CHEMISTRY

BY

J. B. D. ROBINSON,
Chemist.

Soil Investigational Work.

(1) Major Plant Nutrient Investigation.

As stated in last year's Annual Report, soil samples were taken covering the Red, Intermediate Red, Intermediate Black, St. George's Valley, Red Sand, Christ Church Ridge and Black soil types of the coral limestone area over the period 1929-1931, and again in the same or adjoining fields over the period 1947-1948 with a view to comparing present analyses of major plant nutrients with the previous results. The exchangeable and total Potashes have been determined on these soil samples and the results set out in Tables Ia and Ib.

TABLE Ia.
Exchangeable K_2O

Soil Type	No. of Samples	Mean Per Cent. Exchangeable K_2O	
		1929-31	1947-48
Red (over 700 ft.)	25	0.0161	0.0177
Intermediate Red (400-700 ft.) ..	28	0.0123	0.0171
Intermediate Black (200-400 ft.) ..	10	0.0162	0.0194
St. George's Valley (100 ft.) ..	3	0.0139	0.0157
Red Sand (100-300 ft.)	7	0.0060	0.0118
Christ Church Ridge (200-400 ft.)	16	0.0145	0.0186
Black (0-200 ft.)	21	0.0252	0.0264

As was noted, the figures appear to show an increase in the mean percentage of exchangeable potash for all the soil types over the past twenty years. This is not strictly true, for when these figures are submitted to a statistical analysis only the increases shown for the Intermediate Red, Red Sand and Christ Church Ridge soil types are significant. This is to be expected, as any potash applied in excess of cane crop requirements under climatic and coral limestone soil conditions in Barbados should accumulate in the non-exchangeable form, with the exception of the Red Sand soil type, and become evident in the total potash analyses of the soils. (Only transient increases of exchangeable potash in these soils, apart from the Red Sand soil type, would be expected.)

TABLE Ib
Total K_2O

Soil Type	No. of Samples	Mean Per Cent. Total K_2O	
		1929-31	1947-48
Red & Intermediate Red	12	0.1233	0.1652
Black & Intermediate Black ..	10	0.1328	0.1395

Again these figures appear to show an increase, as would be expected, in the total potash over the past twenty years, but when submitted to statistical analysis this is not borne out; these figures have no significance over the 1929-31 results. Further work on this subject is to be carried out.

Similar analyses for comparison of total and exchangeable phosphate, organic carbon and total nitrogen will be carried out upon the arrival of some special apparatus which is ordered.

(2) Soil/Moisture conditions related to Irrigation practice.

With the prospect of irrigation of soils in Barbados becoming more widespread, investigations into soil/moisture relationships of the various coral limestone soil types were initiated. Soil samples for laboratory analyses were taken from a black soil type at Codrington where cane showed distinct signs of wilting, and a red soil type bordering the Red Sand area at Jerusalem Agricultural Station. Samples were taken at 6″ and 9″ depths and, in the latter case, before and after irrigation water had been applied. The results are set out in Table II.

TABLE II

Soil Type	Soil Depth (Approx. 24″)	Mean Moisture content as Per cent. dry soil	
		Mean of 2 Samples	Mean of 2 Samples
Black—Codrington	0— 6″	11.7	15.5
	6—12″	20.4	19.5
	12—18″	29.9	26.9
	Below 18″ to Parent Material (coral rock) (composite sample)	35.5	
Red—Jerusalem, field 1a before irrigation	(Approx. 22″)		
	0— 9″	21.7	sampled
	9—18″	23.7	15.3.49
	18″ to coral rock	37.3	
Red—Jerusalem, field 1a after irrigation	(Approx. 12″)		
	0— 6″	29.23	sampled
	6—12″	36.96	24.3.49
Red—Jerusalem, field 1a after irrigation	Approx. 18—20″		
	0— 6″	30.69	sampled
	6—12″	30.77	24.3.49
	12—18″	30.42	

Field 1a had received four applications of irrigation water at the time of latter sampling, equivalent to six inches of rain.

It will be noted that (a) in the black soil type—Codrington—the soil contained appreciable percentages of moisture at varying depths, although the cane growing on it showed signs of severe wilting. This is due to the high clay content of these soils which retains moisture against the root pressure of the cane. At the same time it is to be noted that the tilth of this soil was very poor below approximately eight inches depth; (b) that in the case of the

Jerusalem red soil type, the four applications of irrigation water have wet the soil to a depth of between twelve and eighteen inches.

Future work on these lines will be carried out primarily in the field with apparatus designed to record moisture content of the soil at a given depth, as it is felt that laboratory analysis alone is not sufficient.

(3) Investigation into Trace Element Deficiency of coral limestone soils

Investigations have been commenced to find the cause and the cure for troubles such as chlorosis in garden beans, dying of lettuce hearts, interveinal and general chlorosis of young cabbage plants and other vegetable symptoms which it is thought may be traced to either trace element deficiencies in the soil or non-availability to the plant due to alkalinity of soil, and hence the very strong oxidising conditions existing. Work, so far of a preliminary nature, has been confined to the black soils. Among the trace elements suspected are iron, manganese, magnesium, boron and zinc. Samples of a black soil in which growing beans were showing severe signs of chlorosis were taken and put into pots. Oats were then grown as indicator plants for manganese deficiency but no visual symptoms were observed. Two beds of young cabbages were divided into plots and sprayed with manganese sulphate alone, ferrous sulphate alone, and a third plot with both applications. Unfortunately all the plots suffered from a soil and/or seed-borne bacterial disease which killed out the young plants. Further work is being carried out with the Botanist, and some special apparatus is now on order.

(4) Soil Survey of Agricultural Stations

Continuing the soil survey at the Agricultural Stations, samples of the following fields have been taken for analysis:—

Haggatts	..	Field No. 1
„	..	„ No. 2, sampled in addition to last year
Groves	..	Field No. 2
„	..	„ No. 3
„	..	House field
Bullen	..	Field No. 3
Sayes Court	..	Field No. 3

Sampling has now been completed at Bullen, Groves and Sayes Court Agricultural Stations.

(5) Soil Conservation

This work, in the form of contour draining and contour cultivating, has been continued during the year. It is apparent, by recent applications for fields to be laid out and the enthusiasm with which demonstrations are received and questions asked, that planters are realising the necessity and advantages of modern soil conservation methods. More and more plantations are now able to tackle their own problems on this subject as they arise, and it is hoped that, eventually, the state will be reached when the Department will lead the field solely in the experimental line.

Nevertheless it cannot be two strongly impressed that a contour system is based on a natural drainage area, and not on the problems of a single field alone, although fields must be tackled individually as they finish ratooning. It is pleasing to note that planters are not averse to joining small field areas together for the sake of a good system where this is shown to be advantageous. A separate report dealing with this particular layout will be published later.

The laying out of a four acre field subject to severe slipping, on the Spring Vale estate, was undertaken and observations are being made for the ensuing season to see how the system will stand up to the rainfall and the effectiveness of the retarding action on the slippage is going to be.

(6) Cultivation Investigation

During the course of various soil investigations on the soil types of the island, it has become increasingly noticeable that soil structure or tilth on many of them exists only to a very limited depth, very often 6—8″, irrespective of total soil depth or type. From this it is logical to conclude that a certain amount of restriction is placed on the roots of a cane plant during its growing season. The most important and obvious cause of this is restricted drainage down the soil profile and subsequent loss of structure, tilth and lack of aeration from the deeper soil upwards. Bearing this in mind a series of cultivation experiments concerning types of cultivation, time of cultivation and the effect on cane yields has been planned and will be executed over the following seasons.

A field of five acres at the Pine plantation has been cultivated on the Camber bed system as part of an experiment to determine the effectiveness of early planting on these black Group IV soils (Turner's classification). Cane will be planted at monthly intervals from June to November.

Manurial Trials with Sugar Cane

The past growing season has been a good one for cane, both from the point of view of total rainfall, and the monthly distributions. Good crops have been harvested, and in the case of manurial trials put down by the Department, maximum utilisation of manurial treatments should have been realised.

The results of the various trials reaped are given below :—

Trial 1

To determine the effects of heavier applications of nitrogen as sulphate of ammonia on yield of cane and per cent. sucrose in juice.

(a) *Ratoons.* Similar experiments carried out on plant canes and reported in last year's Annual Report were continued on the ratoons at three of the centres.

Centres: Red soil type, high rainfall area—Pool and Kendal.
Black soil type, intermediate rainfal area—Wotton.

Lay out: Four treatments in the form of a randomised block, replicated six times.

Variety: B.37161.

Treatments: Plot No. 1—control.
Plot No. 2—4 cwt. sulphate of ammonia per acre.
Plot No. 3—5 cwt. sulphate of ammonia per acre.
Plot No. 4—6 cwt. sulphate of ammonia per acre.

N.B. All plots, including the control, received the equivalent of 1½ cwt. per acre muriate of potash.

Mean yield and per cent. sucrose in juice results are given in Tables III and IV.

TABLE III

Yield in Tons of Cane per Acre (Mean of 6 replicates)

Plot No.	Pool Plantation		Kendal Plantation		Wotton Plantation	
	Yield	Observations	Yield	Observations	Yield	Observations
1	44.29	no significant difference	20.75		8.00	
2	43.88		39.51	significant increase over control	24.83	significant increase over control
3	44.15		39.09		24.89	
4	43.25		40.55		26.76	

A difference of ± 4.95 tons of cane per acre at Kendal and ± 5.54 tons of cane per acre at Wotton has a 20:1 chance of being due to treatment.

TABLE IV.

Per Cent. Sucrose in Juice.

Plot No.	Pool Plantation		Kendal Plantation		Wotton Plantation	
	Mean per cent. Sucrose in juice	Observations	Mean per cent. Sucrose in juice	Observations	Mean per cent. Sucrose in juice	Observations
1	19.1		21.7		18.6	
2	18.3	significant decrease from control	21.0	significant decrease from control	19.1	no significant difference
3	18.0		21.2	„	18.8	
4	17.9		20.4	no significant decrease	18.6	

A difference of ± 0.63 per cent. sucrose in juice at Pool and ± 0.43 per cent. at Kendal has a 20:1 chance of being due to treatment.

(b) *Plant Canes.* A similar experiment was reaped on plant canes at two centres.

Centres : Red soil type, high rainfall area—Pool.
Black soil type, intermediate rainfall area—Bannatyne.

Lay out: Four treatments in the form of a randomised block, replicated six times.

Variety: B.37161.

Treatments : Plot No. 1—control.
Plot No. 2—3 cwt. sulphate of ammonia per acre.
Plot No. 3—4 cwt. sulphate of ammonia per acre.
Plot No. 4—5 cwt. sulphate of ammonia per acre.

N.B. All plots, including the control, received 1½ cwt. muriate of potash per acre.

Mean yield and per cent. sucrose in juice are given in Tables V and VI.

TABLE V.

Yield in tons of cane per acre (Mean of 6 replicates)

Plot No.	Pool Plantation		Bannatyne Plantation	
	Yield	Observations	Yield	Observations
1	35.21	no significant difference	32.06	
2	34.70		39.88	significant increase over control
3	34.31		40.39	significant increase over control
4	33.97		37.36	no significant increase over control

A difference of ±6.05 tons of cane per acre at Bannatyne has a 20:1 chance of being due to treatment.

TABLE VI.

Per Cent. Sucrose in Juice

Plot No.	Pool Plantation		Bannatyne Plantation	
	Mean per cent. Sucrose in juice	Observations	Mean per cent. Sucrose in juice	Observations
1	18.4	no significant difference	18.0	significant decrease from control
2	18.4		17.1	
3	18.5		17.5	
4	18.0		17.2	

A difference of ±0.43 per cent sucrose in juice at Bannatyne has a 20:1 chance of being due to treatment.

Conclusions

(a) *Red Soil Centre — Plant Canes — Pool Plantation.* Under the climatic and soil conditions of this experiment there was no significant difference in yields of cane or per cent. sucrose in juice. The lack of response to applications of sulphate of ammonia is contrary to the findings of previous manurial trials, and an explanation is being sought.

Ratoons — Pool Plantation, Kendal Plantation. At Pool no significant yield difference due to treatment was recorded, but at Kendal there was an increase in cane per acre reaped for the three manured plots. The higher sulphate of ammonia applications showed no significant increase over the normal applications.

Regarding the per cent. sucrose in juice, plots receiving sulphate of ammonia showed a decrease from the control, with the exception of plot 4 at Kendal.

(b) *Black Soil Centre — Plant Canes — Bannatyne Plantation.* The yield was raised in plots 2 and 3 by applications of sulphate of ammonia, but the higher applications did not give significantly greater yields than the normal applications. There was a definite lowering of per cent. sucrose in juice for all plots receiving sulphate of ammonia. The decrease on plots higher than normal applications was significantly less than plots receiving normal applications.

Ratoons—Wotton Plantation. Plots receiving higher applications of sulphate of ammonia gave yields of the same order as plots receiving a normal application, though all plots showed an increase in yield over the control. There was no significant difference in per cent. sucrose of juice due to treatment.

Trial 2

To determine the interaction effects on yield and per cent. sucrose in juice of large applications of nitrogen and phosphoric acid on plant canes. This trial was carried out as a direct result of Prof. Hardy's work in Trinidad where, on certain soils, increased yields of cane have been reported with this type of manuring.

Centres : Red soil centre, high rainfall area — Pool plantation.
Scotland soil centre, intermediate rainfall area — Haggatts plantation.

Lay out : Nine treatments in the form of a randomised block, replicated six times.

Variety : B.37161 at Pool and B.41211 at Haggatts.

Treatments: Plot No. 1—control
„ 2—5 cwt. sulphate of ammonia per acre.
„ 3—10 cwt. sulphate of ammonia per acre
„ 4—5 cwt. superphosphate per acre
„ 5—10 cwt. „ „ „
„ 6—5 cwt. sulphate of ammonia and 5 cwt. superphosphate per acre
„ 7—10 cwt. sulphate of ammonia and 10 cwt. superphosphate per acre
„ 8—5 cwt. sulphate of ammonia and 10 cwt. superphosphate per acre
„ 9—10 cwt. sulphate of ammonia and 5 cwt. superphosphate per acre.

N.B. All plots, including the control, received the equivalent of 1½ cwt. per acre muriate of potash.

Mean yield results and per cent. sucrose in juice are given in Tables VII and VIII.

TABLE VII

Yield in Tons of cane per Acre (mean of 6 replicates)

Plot No.	Pool Plantation		Haggatts Plantation	
	Yield	Observations	Yield	Observations
1	33.70	no significant difference	33.35	no significant difference
2	35.88		36.09	
3	38.18		35.79	
4	33.71		35.98	
5	35.72		36.83	
6	35.55		41.56	
7	35.81		34.99	
8	36.41		31.64	
9	34.08		35.02	

TABLE VIII

Per Cent. Sucrose in Juice

Plot No.	Pool Plantation		Haggatts Plantation	
	Per cent Sucrose in juice	Observations	Per cent Sucrose in juice	Observations
1	19.2		13.7	
2	18.2	significant decrease from control	14.1	
3	17.9	" " " "	13.7	no significant difference
4	19.1		14.4	
5	18.6		14.4	
6	18.5		14.1	
7	18.3	" " " "	13.5	
8	18.1	" " " "	13.3	
9	19.0		13.9	

Conclusions

Under the soil and climatic conditions holding at the time of the experiment (a) at both the Red soil centre and the Scotland soil centre high-nitrogen high-phosphate manuring has not affected an increase in the yield of plant canes; (b) at the Red soil centre there is a noticeable decrease of per cent. sucrose in juice due to heavy nitrogen applications.

N.B. Decrease in per cent. sucrose in juice between plots 1, 2 and 3, though plot 9 does not show a similar decrease.

Trial 3

To determine the effects of later and/or heavier applications of nitrogen as sulphate of ammonia plus a mid and late-crop reaping.

Centre : Black soil centre, intermediate rainfall area—Pine plantation.

Lay out : Twelve treatments in the form of a randomised block, replicated four times.

Variety : B.37161, first ratoons.

Treatments :

Plot no.		Sulphate of Ammonia, cwt. per acre applied in —	
		July	October
1	(control)	0	0
2		0	4
3		0	6
4		2	2
5		2	4
6		4	0
7		4	2
8		6	0

N.B. All plots, including the control, received the equivalent of 1½ cwt. per acre muriate of potash.

Mean yield results and per cent. sucrose in juice are given in Tables IX and X.

TABLE IX

Mid-Crop Reaping, 30-31st March 1949 (mean of 6 replicates)

Plot No.	Pine Plantation					
	Treatment (Cwt. Sulphate of Ammonia per acre)		Yield (tons cane per acre)		Per cent. Sucrose in Juice	
	July	October				
1 (control)	0	0	22.48		20.4	
2	0	4	29.76		19.7	
4	2	2	31.72		20.0	no significant difference
6	4	0	37.39	significant increase over plot 2 ..	19.3	
5	2	4	30.42		19.8	
7	4	2	34.64		19.9	
3	0	6	26.36		19.1	
8	6	0	36.94	significant increase over plot 3 ..	19.8	

A difference of ± 6.98 tons of cane per acre has a 20 : 1 chance of being due to treatment.

TABLE X

Late-Crop Reaping, 26-27th April 1949 (mean of 6 replicates)

Plot No.	Pine Plantation				
	Treatment (cwt. sulphate of Ammonia per acre)		Yield (tons cane per acre)	Per cent. Sucrose in Juice	
	July	October			
1 (control)	0	0	22.65	20.6	
2	0	4	28.03	20.3	
4	2	2	35.03	20.0	no significant difference
6	4	0	35.38	20.1	
5	2	4	34.82	19.9	
7	4	2	33.45	19.5	
3	0	6	24.44	19.4	
8	6	0	38.95	19.1	

A difference of ± 8.29 tons per acre has a 20:1 chance of being due to treatment.

Conclusions

Under the stated conditions of soil and climate —

(i) Although no significant difference exists, the general indications are that the higher applications of sulphate of ammonia have lowered the per cent. sucrose in juice. This is particularly noticeable in the late-crop reaping results.

(ii) *Mid-crop reaping* : All yields, except plot 3, which received 6 cwt. sulphate of ammonia per acre are significantly greater than the control. The yield of plot 6, which received 4 cwt. sulphate of ammonia at the usual time in July, is significantly greater than plot 2, which received its 4 cwt. sulphate of ammonia in October. Similarly, the

yield of plot 8, which received 6 cwt. sulphate of ammonia in July (normal time) is significantly greater than the yield of the late application of 6 cwt. sulphate of ammonia as in plot 3.

(iii) *Late-crop reaping* : All yields, except plots 2 and 3, which received the late dressings of 4 and 6 cwt. sulphate of ammonia per acre, are significantly greater than the control. The yield of plot 8, which received 6 cwt. sulphate of ammonia per acre in July, is significantly greater than plot 3, which received the same dressing in October.

(iv) Thus the application of an equal quantity of nitrogen as a late application has no advantage over the application of the same quantity at the normal time, i.e. with the commencement of rains. There is no advantage in yield to be gained by applying dressings of sulphate of ammonia greater than the present Departmental recommendations.

Manurial Trials to be Reaped in 1950.

A further trial to test applications of phosphate in combination with nitrogen and potash has been laid down in the Scotland district at Haggatts Agricultural Station on a second ratoon crop.

Another trial to determine the effects of later and/or heavier applications of sulphate of ammonia on yield of cane and juice quality of ratoons, plus different times of reaping, has been laid down on a Red soil in the high rainfall area. Here fuller utilization of the heavier nitrogen applications than in a low-intermediate rainfall area, such as the Pine where previous experiments were carried out, would be expected.

The trials at Pool and Haggatts with high nitrogen and high phosphate are being continued as first ratoons.

Phosphate Content of Cane Juices.

Work is in progress to compare the effects of season, variety and manurial treatments, on the phosphate content in cane juice. It is interesting to compare present figures with figures obtained by Dr. Saint in the years 1928, 1929 and 1930. Mean results obtained by Dr. Saint are given in Table XI.

TABLE XI

Variety of Cane	Year	Content of P_2O_5 in mgms./litre of juice
Ba.11569	1928	382.0
B.417	1928	399.0
B.381	1928	401.0
Ba.11569	1929	154.0
B.417	1929	162.0
B.381	1929	142.0
Ba.11569	1930	398.0
B.417	1930	413.0
B.381	1930	420.0

Variation in P_2O_5 content of juice for the same cane varieties in years 1928, 29, 30 was attributed by Dr. Saint to climatic variation during crop season.

Results of 1948 analyses, variety B.37161, cane samples taken from estates in the dry areas of the island—Table XII.

TABLE XII.

Origin of Cane Sample	Mgms. P_2O_5 per litre of cane juice	Origin of Cane Sample	Mgms. P_2O_5 per litre of cane juice
Spring Hall	320.1	Springhead	330.5
Castle	594.8	Apes Hill	429.6
Bright Hall	835.1	Taitts	183.3
Lamberts	363.5	Walkers	456.7
Mt. Prospect	540.7	Rose Hill	453.6
Haymans & Warleigh ..	252.4	Peasants	303.4
Black Bess	420.5	Cane Garden	381.5
Mangrove	242.3	Francia	366.5
Gibbes	435.6	Waterford	249.3
Bennetts	348.5	Lower Estate	228.3
Sandy Lane	681.9	*	225.3
Norwood	733.0	Rowans	300.4
Plum Tree	222.3	Neils	486.7
Fort Belvedere	369.5	Haggatts	600.8
Welch Town	297.4	Spring Vale	585.8
Gregg Farm	204.3	Parks	87.1
Sion Hall	513.7	Cambridge	288.4
Hope	369.5	Greenland	342.5
Lancaster	339.5	Bawdens	321.5
Spring	420.5	Friendship	237.3
Westmoreland	300.4		
	Mean value=349.0		

* Source not available.

If the standard of P_2O_5 content in cane juice necessary for good clarification, as set out by Bliss (I.S.J. 1948), is accepted, i.e. 275–366 mgms. P_2O_5 per litre of juice, then there are only a few juices which are really well below the lower figure here. Thus it would not appear that the phosphate content of juices was the major cause of difficult clarification in the 1948 crop season, if these figures can be taken as representative of cane juices at these estates throughout the season.

During the 1949 crop juice samples from all the manurial trial plots of the Department were analysed in duplicate; the results, with the plot treatments, are set out in Table XIII.

TABLE XIII.

Origin of Juice	Treatment of Plot (cwt. per acre)			Variety of Cane	Mgms. P_2O_5 per litre of juice
	N.	P.	K.		
Wotton:					
Plot No. 1 ..	0	—	1½	B.37161 (1st Ratoons)	832
„ 2 ..	4	—	1½	„ „	421
„ 3 ..	5	—	1½	„ „	354
„ 4 ..	6	—	1½	„ „	318
Bannatyne:					
Plot No. 1 ..	0	—	1½	„ „	607
„ 2 ..	4	—	1½	„ „	258
„ 3 ..	5	—	1½	„ „	400
„ 4 ..	6	—	1½	„ „	376

TABLE XIII (*Cont'd*)

Origin of Juice	Treatment of Plot (cwt per acre)			Variety of Cane	Mgms. P_2O_5 per litre of juice	
	N.	P.	K.			
Pool:						
Plot No. 1 ..	0	—	1½	B.37161 (1st Ratoons)	357	
„ 2 ..	4	—	1½	„ „	330	
„ 3 ..	5	—	1½	„ „	297	
„ 4 ..	6	—	1½	„ „	330	
Kendal:						
Plot No. 1 ..	0	—	1½	B.37161 (Plant Canes)	835	
„ 2 ..	3	—	1½	„ „	348	
„ 3 ..	4	—	1½	„ „	288	
„ 4 ..	5	—	1½	„ „	339	
Pool:						
Plot No. 1 ..	0	—	1½	„ „	724	
„ 2 ..	3	—	1½	„ „	246	
„ 3 ..	4	—	1½	„ „	409	
„ 4 ..	5	—	1½	„ „	421	
Pine : (1 mid-crop reaping of Nitrogen Experiment).					Mid-crop	Late-crop
Plot No. 1 ..	0	—	1½	B.37161 (1st Ratoons)	865	862
„ 2 ..	4(L)	—	1½	„ „	508	565
„ 3 ..	6(L)	—	1½	„ „	382	424
„ 4 ..	2(E) 2(L)	—	1½	„ „	502	625
„ 5 ..	2(E) 4(L)	—	1½	„ „	535	568
„ 6 ..	4(E)	—	1½	„ „	463	583
„ 7 ..	4(E) 2(L)	—	1½	„ „	373	574
„ 8 ..	6(E)	—	1½	„ „	466	451
Pool & Haggatts:				(1st Ratoons)	Pool	Hag-gatts
Plot No. 1 ..	0	—	1½	Pool B.37161, Hag-	508	234
„ 2 ..	5	—	1½	gatts B.41211	366	171
„ 3 ..	10	—	1½	„ „	324	168
„ 4 ..	0	5	1½	„ „	493	261
„ 5 ..	0	10	1½	„ „	583	204
„ 6 ..	5	5	1½	„ „	351	189
„ 7 ..	10	10	1½	„ „	324	213
„ 8 ..	5	10	1½	„ „	336	207
„ 9 ..	10	5	1½	„ „	460	195

N.B. Letters (E) & (L) indicate time of application of nitrogen, i.e. (E)=July application, (L)=October application.

Conclusions

(1) Almost without exception all the control plots (plots No. 1) which received, in every case, potash only, gave cane juices having the highest phosphate content. Plots receiving dressings of sulphate of ammonia generally gave juices lower in P_2O_5 than the control plots. This seems to indicate an antagonism in nutrient uptake between nitrogen and phosphate. In the high-nitrogen high-phosphate trials (last set of data) plots No. 4 and 5 which received no nitrogen show increased P_2O_5 content in juice.

(2) The P_2O_5 content of the varieties B.37161 and B.41211 in the high-nitrogen high-phosphate trial is interesting, as the B.41211 juices show much lower figures. There would seem to be a varietal difference in the phosphate uptake of these canes. In view of this, the juice of B.41211 should present greater difficulty of clarification

than B.37161. On the other hand, soil variations between the two experimental centres may account for the difference, though the phosphatic manure application was very high.

Milling Laboratory

The milling laboratory dealt with three hundred and sixty-four sample bundles of cane in connection with the Departmental manurial trials and the seedling trials of the B.W.I. Central Sugar Cane Breeding Station. The expressed juice and resultant megass were analysed, and the sugar and fibre content of the whole cane determined. The phosphate analyses of cane juices reported previously were carried out on the manurial trial juice samples expressed by the mill.

Animal Nutrition

Feeding standards for dairy cows were set out from available data for the feeding of balanced rations to the cows at the Central Livestock Station. Analyses of the fodders being fed and periodic analyses of the Balanced Animal Feed were carried out in connection with this rationing system. Three silage samples from the Home Agricultural Station and three from the Central Livestock Station were also analysed to determine their feeding value.

In conjunction with the work carried out by the Botanist, twenty-four samples of Indian corn (maize) from plots at Codrington were analysed.

Milk Analyses

A system of monthly milk analyses of the cows at the Central Livestock Station was instituted with a view to determining quality of milk, and to note any fluctuations in Butter Fat content. A summary of results obtained to date are given in Table XIV.

TABLE XIV.

Mean Figures for Milk Analyses at Central Livestock Station

Month	No. of Samples	Butter Fat Per Cent.	Per Cent. Solids not Fat (by calculation)
November 1948	18	4.63	8.51
December „	15	4.33	8.69
January, 1949	17	5.01	8.99
February „	18	4.27	8.99
March „	18	4.16	8.85

N.B. These figures are weighted means obtained by sampling the milk of each cow at a morning and afternoon milking, and mixing these in proportion to yield to give one sample for each analysis.

Miscellaneous

Two analyses of Dry Matter in sweet potatoes which had been clamped for a period of time were carried out.

Three estimations of the active form of D.D.T. in samples of commercial D.D.T. were carried out.

The determination of Vitamin C content of some local Barbados foods were carried out in collaboration with the Island Nutritionist.

Samples of sugar cane, B.37161 variety, have been sent to Dr. L. F. Wiggins, who is carrying out research for the Colonial Products Committee, at Birmingham University, at intervals throughout the season.

GOVERNMENT LABORATORY

By

C. A. COPPIN,
Government Analyst.

Analytical Work

(a) FOOD AND DRUGS LABORATORY.

The total number of samples examined during the year for the various Government Departments and for private individuals was 1,171.

The number and distribution of samples dealt with annually for the past five years is set out in Table I.

TABLE I.

	1944	1945	1946	1947	1948
Police Department	350	343	261	236	205
Customs Department	54	42	75	98	95
Public Works Department ..	8	15	30	7	14
Agricultural Department	316	176	46	179	199
Parochial Departments	371	334	319	333	330
Agricultural Society	62	58	62	56	40
Other Government Departments	76	80	40	41	53
Private Individuals	140	108	140	153	235
Total	1,377	1,156	973	1,103	1,171

Particulars of the various samples analysed in the Food and Drugs Laboratory for 1948 are—

(i) *Police Department*:

Viscera, examination of poisons and exhibits	17
Coins and counterfeiting exhibits	1
Butters and cooking oils	24
Milks	102
Tea, coffee, cocoa etc.	37
Animal feed	5
Rum	19
Total	205

Viscera, exhibits and Examinations. One and a quarter grains of quinine were separated from the viscera of a girl alleged to have been using abortifacients.

Five grains of Salts of Sorrel (Oxalic acid) were found in cocoa in a case of attempted administration. No trace of poison could be discovered in—

(a) viscera of a man suspected to be poisoned;

(b) contents of stomach removed from a cow suspected to be poisoned;

(c) Fruit suspected to be injected with poison;

(d) cooked rice.

Coins and Counterfeiting Exhibits. Only one sample was submitted during the year—this was counterfeit.

Butters and Cooking Oils. All samples submitted were genuine.

Milks. Out of a total of one hundred and two samples received for examination, six samples were found to be adulterated by the addition of water.

Tea, coffee, cocoa etc. All samples were genuine.

Rum. All samples were found to be genuine and of legal strength.

Foods and Feeding Stuffs, were all genuine and of satisfactory quality.

(ii) *Customs Department*:

Petroleums	68
Miscellaneous	27

Petroleums consist of gasolenes and kerosenes for density determination and Flash point.

Miscellaneous samples include butters for water content, milks for fat content, and other samples for classification. Three denaturants for methylating purposes were submitted and found satisfactory.

(iii) *Water-works Department*:

The usual quarterly analyses of the public supply were carried out. Free chlorine content was checked in samples likely to become contaminated.

(iv) *Department of Agriculture*:

The examination of a number of samples of soil from various plots and stations form part of the report of the Soil Chemist. In addition, a number of fodder grasses were examined. The quality and protein content of the local Balanced Animal Feed was periodically checked.

The Water supply of the various Agricultural Stations was specifically examined for salt content.

The phosphate content of cane juices was investigated for a number of varieties from under poor soil and rainfall conditions.

A number of samples of clay was chemically examined in connection with the work of the Ceramist.

(v) *Sanitary and Parochial*:

A number of food products suspected to be unfit or doubtful for human consumption was submitted.

The E.C. disinfectants produced by the Commissioners of Health were regularly submittted and checked for chlorine content.

Three hundred and twenty-nine samples of milk were submitted by the Commissioners of Health. Thirty-three of these were found to be adulterated by the addition of water.

(vi) *Agricultural Society*:

The samples of sugar and molasses submitted were analysed and examined in connection with the prize awards at their Annual Industrial Exhibition.

E.C. disinfectants were examined for Hospital authorities.

(vii) *Other Government Departments*:

This Laboratory carried out periodic checks on the quality of the coal gas as supplied by the Barbados Gas Company.

Syrups and molasses were examined for the Molasses Control Board.

(viii) *Private Individuals*;

Analyses under this head were as follows:—

Sugars and Molasses	130
Cane juices	27
Fertilizers and feeding stuffs	7
Instruments for calibration	10
Waters	14
Milks	17
Miscellaneous	30
Total	235

(b) SUGAR LABORATORY

This Laboratory, taken over from Professor d'Albuquerque in 1929, has been run as a commercial undertaking yielding an average surplus revenue of £1,200. The large number of samples previously examined (around 42,000) was discontinued and replaced by a more complete analysis indicating the storage characteristics of the sugar.

Sugars—complete analyses	311
polarisation tests only	1,833
Syrups—gravity and polarimetric test	1,418

In the above connection, an investigation of polarimetric test and true sucrose figures was made. A centrifugal method was also devised to determine. with rapidity and accuracy, the insoluble matter in sugars. Spencer vacuum ovens replaced other equipment in this laboratory for the rapid moisture determinations required.

Investigational Work

(a) *Government Factory.* The Government Factory operated during the year and produced a record of over 30,000 bags of potato meal, used in mixing the Balanced Animal Feed. Recovery was over ninety-five per cent. based on a dry matter basis, and the efficiency of dehydration improved.

(b) *Pottery* experiments were continued at the above Factory in which the Laboratory collaborated. Visits were also paid to the natural gas-fired kilns at Apes Hill where high quality lime for the sugar industry is being produced.

(c) *Cotton Spinning Plant.* Advice and technical assistance was given towards the improvement and expansion of the Plant.

SECTION VI.

ENTOMOLOGY

By

J. E. CLARKE,
Agricultural Assistant (for Entomologist, absent on leave)

The year ending 31st March, 1949, has seen few changes in the routine entomological work.

During the year, a further attempt was made to introduce and establish the larval parasites, *Lixophaga* and *Paratheresia claripalpis*, for controlling the small moth borer *Diatraea saccharalis* in cane fields. It will be recalled that these larval parasites were introduced here on previous occasions but do not appear to have established themselves due to unfavourable conditions at the time.

Because of conditions which were considered good during the year, these parasites were re-introduced with the hope of being established. In consequence, several consignments of *Lixophaga* and *Paratheresia* puparia were received of which most were liberated. Some of the *Lixophaga* puparia were kept for laboratory rearing. These parasites were received from Trinidad by co-operation with the branch service of the Commonwealth Bureau of Biological Control, the headquarters of which are at Belleville, Ontario, Canada. These shipments were organised by Dr. F. J. Simmonds.

Arrangements have also been made for the introduction of other beneficial parasites and predators, including parasites of *Plutella maculepennis* and *Pieris monuste*, which are definite nuisances to growers of cabbage, cauliflower, etc. If parasitic control of these pests can be established it is obviously preferable to continuous dusting and spraying which, in most cases, is either done too late or with too little insecticide to be effective.

During the year, an adequate range of insecticides was made available for sale at standard prices at the seed section of the Department for use in vegetable plots and household gardens. This venture appears to be very successful, judging by the demand for these insecticides by the public.

A large tractor-drawn power Myers du-All Sprayer was acquired by this Department for spraying food crops.

Small Moth Borer (Diatraea Saccharalis)

During the year under review a total of 446,582,272 egg parasites of *Trichogramma minutum* was bred in the laboratory and, after retaining the necessary proportions required for the maintenance of the breeding cycle, a total of 408,259,488 was available for distribution to plantations; there was a slight falling off during July in the number of planters who fetched the quota of parasites from the Department. This may be partly due to the rain and the rapid growth of canes which made some plant cane fields difficult to enter. The field distribution of these parasites is entirely in the hands of the planters and the Department has no control over the efficiency of this distribution.

In order to control still further the damage caused by moth borer in sugar cane, arrangements were made with Dr. Simmonds, of the Commonwealth Bureau of Biological Control in Trinidad, to send, by air mail, consignments of puparia

of the *Diatraea* larval parasites *Lixophaga* and *Paratheresia.* These consignments were started in October and ended in January. During this period, 2,131 *Lixophaga* puparia were received; of this number, 586 did not emerge, leaving a total of 1,545 *Lixophaga* fly parasites. From this number 1,468 were liberated in matured cane fields; the remainder were kept for laboratory rearing. During the same period. 300 *Paratheresia* puparia were received and liberated in cane fields as they emerged. So far 779 *Diatraea* larvae have been inoculated from which 893 *Lixophaga* puparia were recovered.

One hundred and thirteen *Lixophaga* fly parasites were liberated during March. This represents the first batch of parasites liberated from the laboratory rearing. It is hoped to increase these liberations from time to time with the co-operation of the planters in supplying dead hearts in sufficient numbers whereby a reasonable number of larvae can be obtained.

The annual average figure of cane joint moth borer, *D. saccharalis,* infestation made at factory yards, was reduced to an average of 11.1 per cent internodes as against 14.9 per cent. for the previous year. The majority of samples taken were of the variety B.37161. The standard method was applied by selecting samples of canes at random as in previous years.

Cane Varieties and D. saccharalis

Work was also maintained on the relationship between rind hardness incidence of borer *D. saccharalis* egg deposition and parasitism on different block cane varieties. This work is usually done at Codrington in co-operation with the Central Sugar Cane Breeding Station.

Root Borer of Sugar Cane (Diaprepes abbreviatus) and Brown Hard Back (Clemora smithi).

This pest, which was brought under reasonable control previous to 1939, has been steadily on the increase for the past few years, and warnings to this effect have been given. It was hoped that more intensive ploughing would take the place of extensive hand collecting of adult beetles, as the latter method of control has been almost entirely discontinued on the plantations. The beetle and its grubs have been found in several areas of the island, especially in the north-west areas, where it was more noticeable.

Field trials have been laid down at plantations in this area to test the use of Agrocide 2 (Gammexane 3½ per cent. dust) in fields known to be infested with root borer. Results of this experiment will not be known until 1950. In the meantime the Department has obtained one ton of this material in readiness for further experiments. An article describing the damage and advising preventive measures was published by the Department in the press during the year.

Sugar Cane Stem Borer (Metamasius Sericeus)

This pest has decreased in numbers considerably and is not as numerous as in previous years.

Food Crops

The Army Worm, *Laphygma eridania,* was the main insect pest of sweet potato, and appeared earlier than usual. In some instances, this pest reached army proportions and defoliated other crops; however, much spraying was carried out to effect the control of this pest. Many army worms were collected and kept in the laboratory for observation and it was later discovered

that fly parasites emerged from pupae of the army worms. Some of these fly parasites were sent to the U.S.A. and were identified as *Archytas Divisa.*

Plantings of corn, peas and beans have suffered badly in some areas due to lack of spraying precautions. An article by the Department on the value and economics of spraying was published in the press. Demonstrations have been given with a large tractor-drawn power Myers Du-All sprayer, which is capable of spraying five acres thoroughly in a half-day.

One case of fairly severe damage to oranges by fruit-piercing moths was investigated. This appears to be the first recorded case in Barbados of fruit-piercing moths causing damage which has been brought to the notice of the Department.

Scarabee of Sweet Potato (Euscepes postfasciatus)

The position with regard to this pest remains unchanged since the last Annual Report.

Cottony Cushion Scale (Icerya purchasi)

One small outbreak of this pest was reported during the year; fortunately the introduced predator, *Rodolia cardinalis,* which controls this scale was also found to be present.

Coconut Scale (Aspidiotus destructor)

Extensive inspections were carried out for the introduced predators for the control of *Aspidiotus destructor.* Various species have been liberated, mostly in the leeward areas, and of these only one specie, *Azya trinitatis,* can be said to have established itself.

Wood Ant Control

The demand for the inspection of Government buildings, including churches, schools, and also private buildings, kept the Wood Ant Inspector fully occupied. Demands for the services of the Inspector by the public continue to increase considerably.

Shipments of cases of tea and shoes were also inspected during this period.

Fumigation

During the year only 2,200 empty copra bags were fumigated with Hydrocyanic Acid gas for the Barbados Co-operative Cotton Factory; this is the smallest number which has been dealt with for many years.

The Fumigatorium was completely reconstructed and improved; it is now possible for two simultaneous treatments to be carried out, or for storage and fumigation under insect proof conditions to be effected at the same time.

Economic Zoology

Zinc Phosphide baits continued to be used for the control of rats in canefields, warehouses, etc. This work is carried out by the Agricultural Society.

PLANT DISEASES AND COTTON

By D. R. D. WILES,
Plant Diseases Inspector

Mosaic Disease of Sugar Cane

Two hundred and thirty-seven returns were received in accordance with Section 3 (1) of the Mosaic Disease (Eradication) Act, 1943 (1943—22), disclosing the presence of thirty-seven infected holes which were destroyed. The infected holes were reported from scattered areas in the parishes of Christ Church, St. Philip, St. Andrew, St. Thomas and St. Peter. The reduction in the number of infected holes is, no doubt, due to the increased acreages planted in the highly resistant variety B.37161.

Cotton

The Okra and Cotton Close Season extended from the 1st April to 30th June, 1948, and the distribution of seed for planting commenced in July 1948, when seed was distributed to plant 1,056½ acres, but due to various factors, mainly weather conditions, only 721¾ acres came to maturity. These were made up as follows:— plantations 140¾, peasants 581; a yield of 221,116 lb. of seed cotton was obtained which gave 58,169 lb. lint.

	Plantations	Peasants
Seed cotton	45,319 lb.	175,797 lb.
Lint	11,604 lb.	46,565 lb.
Yield	25.6 %	26.4 %

The increased acreage planted this year was due to the early announcement of a satisfactory price to be paid for the crop. This was published prior to planting, and was the outcome of the visit of Mr. I. M. L. Oliver, representative of the Raw Cotton Commission, earlier in 1948.

Weather conditions during the latter part of 1948 considerably damaged the growing crop and lessened the acreage to be reaped, but due to a small amount of sulphate of ammonia being made available the Island yield per acre was improved.

Cotton Selection

The variety B.1 continued to be used as the standard variety, and the following varieties were used to plant a variety trial (Trial A) at Codrington:— B.4, B.4212, B.4301, B.4309, B.4310, B.4401, B.4404, B.4411 and B.4413. Another variety trial (Trial B) was planted using the following varieties which were obtained from the Progeny Row Experiment of last year, viz. B.1(3), B.4701, B.4702, B.4703, B.4704, B.4705, B.4706, B.4707 and B.4708. The reaping of these trials took place from early January until the end of February, when yields of over 800 lb. seed cotton per acre were obtained. Further selection will be made from the latter trial in order to determine which varieties will be retained for planting on a plantation scale.

Selection of seed for the Progeny Row Experiment was made from the following varieties :— B.1, B.4,B. 4301, B.4310, B.4411, B.4309 and B.4404, and

yields of over 1,300 lb. seed cotton per acre were obtained. Five strains have been selected from these and will be placed in the variety trials at Codrington.

The average maximum lint length has been found to be 60 mms., and from the sales reports it has been observed that the standard of Barbados cotton lint is being maintained.

Cotton Pests and Diseases

The defoliating worm, *Aletia argillaceae*, put in its appearance at the usual time but, in the majority of instances, was successfully controlled by spraying with Lead Arsenate. No pink boll worm was observed during the period under review.

The routine inspection of articles suspected to contain raw cotton from abroad was also carried out.

Plant Pest and Disease (Importation) Act

Eight permits to import planting material were issued under this Act.

Plant Export Certificates

Seventy-two plant export certificates were issued during the year.

Miscellaneous Inspections of Imported Planting Material

262	packages of bulbs, rose trees, vegetable and flower garden plants and seeds	—examined and passed
14	Cypress plants	do.
17	packages of Orchid plants	do.
2	Orchid plants	do.
1	package of Hibiscus plants	do.
1	„ of Oleander cuttings	do.
1	„ of Begonia plants	do.
2	Mango plants	do.
2	Hydrangea plants	do.
1	Palm	do.
817	Coconut plants	do.
5	bags of seed Coconuts	do.
16	bundles of Xmas trees	do.
6	Hydrangia plants	—roots washed
2	Pear plants	do.
27	bundles Xmas trees	do.
1	plant	do.

SECTION VIII.

ANIMAL HUSBANDRY

By A. G. MILL,
Livestock Officer

In the Department

During the year the policy of stocking the Government Stations with good quality livestock was continued. Careful mating of 'good' dams to imported sires was carried out, progeny which measured up to fixed standards was retained and herds and flocks were culled of undesirable animals. Although it was difficult to obtain good quality dairy cows, this Department was fortunate in securing from outside sources within the Colony several animals which will be of great value as foundation stock.

Several of the heifers bred from imported sires are now in calf to other imported animals and should 'calf down' during 1949.

During his visit to the United Kingdom, the Livestock Officer selected the following animals for the Barbados Government:—

1 Holstein Fresian Bull
2 Wiltshire Horn Rams
2 Large Black Boars

These animals arrived during the year and are on service at the Central Livestock Station. The two 'Wiltshire horn' rams are being used on local 'black-belly' ewes. Several of these ewes have lambed and, although it is still too early to comment on the 'cross', the results appear to be promising.

A Guernsey bull of the famous 'Rouvets' strain was presented to the Barbados Government by Mr. Ronald Tree of Ditchley Park, Oxon., England. The young bull arrived during the year and is housed at the Central Livestock Station. This animal should be of considerable value in the improvement of strains of dairy cattle, and the island is indeed fortunate in securing an animal of this rare strain. Statistics of livestock in possession are given in Table I.

TABLE I

Census of Livestock at Agricultural Stations and Central Livestock Station.

Livestock	31st December, 1947	31st March, 1949
Bulls	17	22
Boars	14	13
Buck Goats	16	15
Rams	10	10
Horses	5	7
Cows	36	45
Heifers and calves	39	46
Sows	28	22
Other Pigs	74	44
Doe Goats	9	9
Kids	2	19
Ewes and lambs	6	15
Mules	6	5
Donkeys	2	2
Cocks	8	7
Hens	38	64
Chickens	18	57
Totals	328	402

The first distribution to the Local Agricultural Stations from the Central Livestock Station of grade bulls bred from imported animals was made during the year. Other stud animals bred from imported livestock were also transferred to the local Agricultural Stations. The demand for the services of Government stud animals continues to increase. Reference to Table II shows that this increased demand is not confined to any one type of livestock:—

TABLE II

Services to Livestock other than Government Livestock

	1946—47	1947—48	1948—49
Cows	1,163	1,638	1,710
Goats	1,118	1,559	1,669
Sheep	775	693	855
Pigs	573	776	967

The service fees charged are as follows:—

Bulls (imported)	$ 5.00
Bulls (grade)	.72
Boars (imported)	1.20
Boars (locally bred)	.48
Bucks (imported)	1.20
Bucks (local pure bred)	.60
Bucks (grade)	.18
Rams	.18

A total quantity of 134,198¼ lb. of milk was produced at the Central Livestock Station during the period 1st April, 1948 to 31st March, 1949. Production was distributed as follows:—

1948	April	14,260 lb.
	May	14,858½ „
	June	13,462¼ „
	July	11,950 „
	August	10,069 „
	September	9,069¾ „
	October	9,122½ „
	November	8,230¾ „
	December	8,199¼ „
1949	January	10,043 „
	February	11,952 „
	March	12,981¼ „
		134,198¼

This production is almost double that for the similar previous period.

In addition to this, some 8,207 gallons of milk were produced at the District Agricultural Stations.

Care is being taken in disposing of this milk, to disrupt as little as possible the business of private dealers in milk.

Further numbers of animals and poultry of good strain were made available to livestock keepers from surplus stock at the Stations.

Experiments at the Central Livestock Station, in the production locally of fodders with higher protein content than those at present grown in the Colony, are being continued under the supervision of the Botanist attached to the Department.

Pumping equipment on order from the United Kingdom has been shipped and is expected to arrive early in the 1949—50 year. A complete set of overhead irrigation equipment, capable of irrigating forty acres, has been presented to the Central Livestock Station by Messrs. Major Aluminum Products, Ltd., Vancouver, B.C. This equipment should also arrive in the near future.

Silage is being made at the Central Livestock Station to be used during the dry season when shortage of fodder is anticipated. A tower silo has been erected and has been filled. The pit silos at the Central Livestock Station and the District Agricultural Stations have also been filled.

Extension Work

Dairy Farming. The expansion of the dairying industry is expected to take place in the country rather than in the city. Land-owners are still being persuaded to keep dairy cattle, but as pointed out in the previous Report, difficulty of disposal of dairy produce is the main obstacle which is being encountered.

A committee of actual and potential milk producers, under the Chairmanship of the Director of Agriculture, is actively engaged in the consideration of the setting up of a central Depot and Creamery. Such an establishment would overcome many of the dairy farmers' problems. The committee is aware that—

> "The greatest difficulty visualised by the prospective dairy farmer is "the disposal of the milk. Although many land-owners are prepared "to keep dairy cows for the production of milk and manure, they are not "prepared to organise and administer a retail distribution. There seems "little doubt that the only way in which an increased production of "fresh milk on the plantations and small holdings can be stimulated, will "be by the setting up of a Central Creamery to which milk can be sent "for processing and from which delivery to the consumer can be organ-"ised. The present retail distribution of milk has no central organisation " and it is usual to find several dairies making deliveries in the same "districts; this leads to unnecessary duplication and expense. The Cen-"tral Milk Depot, which will be equipped as a pasteurising plant, will "be in a position to supply clean unadulterated milk. The pasteurisation "and refrigeration of fresh milk will improve the keeping qualities of "fresh milk and encourage a greater consumption. At the present time, "almost all consumers boil their milk after receiving it, and it must be "noted that the adulteration of milk is not uncommon."

It is confidently expected that plans for the establishment of the Creamery will be drawn up and implemented in the near future.

Export Markets. There was an increasing demand for sheep, goats and poultry by other West Indian colonies. The local needs for these types of livestock were well provided for, and it was possible to allow the export of limited numbers.

The local requirements of dairy cattle and swine were not yet sufficiently well taken care of to permit of the export of these types of livestock.

ANIMAL HEALTH

By

L. R. HUTSON,
Veterinary Officer.

A Veterinary Officer, a new appointment, was posted to the Department as from the first of June, 1948.

In view of the fact that for many years there was no such officer, at least not on a full time basis on the Agricultural staff, the major part of the work carried out during the period under review comprised initial surveys and investigation into the existent animal diseases amongst livestock in the island. In addition to this major problem, the officer is responsible for (a) veterinary attendance on all Government owned livestock, (b) measures directed towards the prevention and control of communicable animal diseases, and (c) is required to assist and co-operate in the maintenance of the island's animal husbandry industry.

General Position with Regard to Animal Health

At the onset, it can be stated that the island is free from the majority of the serious infectious and contagious animal diseases which exact such a heavy toll in other countries. Furthermore, it is very gratifying to record that there have been no outbreaks of communicable diseases in the period under review. The general statement can be made that the average standard of animal health in the island was maintained.

The following is a summary of observed and reported animal diseases :—

(1) Infectious and Contagious Diseases

Class of Animal	Bacterial	Virus	Protozoan	Fungoid
Horsekind	Tetanus Distemper			Ringworm
Cattle	Mastitis Johne's Disease Metritis Brucellosis		Piroplasmosis Anaplasmosis Trichomoniasis	Ringworm
Goats	Mastitis Adenitis		Coccidiosis	
Poultry	Fowl Typhoid Coryza Pullorum Disease (B.W.D.)	Fowl Pox Avian Leucosis Complex	Coccidiosis Trichomoniasis	

(ii) Parasitism

In horsekind, cattle, goats, sheep, swine, poultry, cats and dogs—

(a) Helminthiasis

(b) Ecto-Parasites.

(iii) Diseases of the Alimentary System

Bovine and Equine indigestion of various forms.

(iv) Diseases of the Genito-Urinary System

Dystokia; Retained Placentae; Urinary and Cystic calculi.

(v) Disorders of Metabolism

Ketosis.

(vi) Nutritional Diseases

Nutritional Roup (vitamin deficiency); Visceral Gout; Perasis (Manganese deficiency). (All in poultry.)

(vii) Miscellaneous Diseases

Traumatic injuries and lamenesses, including wounds.

Review of Diseases

The following call for comment:—

(1) Mastitis

In an attempt to assess the incidence of this disease as affecting the dairy industry in the island, a limited survey was carried out and the following data obtained:—

No. of dairies surveyed	6
„ cows tested	155
„ „ showing mastitis	49
„ „ quarters tested	609
„ of dead quarters	11
„ positive quarters	55
„ of negative quarters	554
„ cows infected in 4 quarters	5
„ „ „ „ 3 „	4
„ „ „ „ 2 „	9
„ „ „ „ 1 quarter	31

Further investigations are being carried out as to (a) system of milking hygiene observed, (b) incidence of disease as related to age, and (c) causative organisms.

(2) Johne's Disease

Suspicion was directed towards the possible presence of this disease in dairy cattle by reason of clinical symptoms, and one highly suspected case was subjected to the specific allergic test. This animal gave a strong positive reaction and the diagnosis was confirmed by the examination of pathological specimens at post-mortem. The presence of bacilli was demonstrated both in smears from the messenteric lymph glands and mucous membrane of the bowel. In addition, pathological studies of sectioned tissue revealed the characteristic findings associated with this disease. This appears to be the first confirmed case of Johne's disease in the island, and a separate report has been prepared and submitted for publication.

(3) Brucellosis

This disease in cattle appears to have been present in the island over a number of years. Fortunately, it does not appear to be causing any conspicuous number of abortions or allied sterility and it would seem as if a high degree of immunity has been established amongst the breeding females.

A limited number of serum-agglutination tests were carried out in six herds, as follows:—

No. of Tests	*No. of Positive Reactors*	*No. of Negative Reactors*	*No. of Suspicious Reactors*
120	3	107	10

(4) Pullorum Disease (Bacillary White Diarrhoea)

There does not appear to have been any confirmed record of this disease amongst poultry in the island, although the incidence was probably suspected. A limited survey was made and the following data obtained:—

No. of flocks tested	4
„ birds „	480
„ reactors (whole blood agglutination test)	23

Bacteriological confirmation of this infection was found both at post-mortem examination of reactors and of young chicks. No evidence of infection was found in the limited tests (12) made on turkeys.

(5) Trichomoniasis (Cattle)

It would appear that the presence of this infection amongst cattle in the island has been long suspected as being responsible for breeding difficulties. During the course of investigations made as to the incidence of this infection, it was possible to demonstrate the organism, both from the preputial washings of infected bulls, and from aborted foetuses of infected cows.

In view of the seriousness of this disease as affecting the dairy industry of the island, the above findings have been publicised and advice, in the form of lectures, given as to the control of the disease through breeding programmes.

(6) Trichomoniasis (poultry)

This infection was found at post-mortem examination of a hen from a flock in which there had been a few unaccounted-for deaths. The lesions were confined to the crop, and while no definite determination of the organism responsible for the condition was made, the tentative diagnosis of *Trichomonas gallinae* is submitted pending study of any additional cases.

(7) Coccidiosis

Infection with coccidia was observed both in poultry and in goats. In chickens the caecal type, *Eimeria tenella*, was demonstrated while *Eimeria arlongi* was responsible for the disease in goats.

In both cases the infections were successfully controlled by the use of Sulfamethazine.

(8) Parasitism

Livestock in the island, as in other parts of the world, suffer from their complement of parasites. In the absence of any check list of such parasites, a start was made in the collection and identification of those infesting the

different classes of livestock. At the moment it would be premature to make a statement as to the class which is most affected, or the individual parasites which are causing the greatest damage.

The following is a list of collected parasites which have been identified; others await identification.

INTERNAL PARASITES

Host	Location of Parasite	Name of Parasite	Degree of Infestation
Pig ..	Lung	Metastrongylus elongatus	Fairly heavy
„ ..	Large Intestine	Oesophagostomum sp.	Light
„ ..	Stomach	Arduenna strongylina	Heavy
„ ..	Small Intestine	Ascaris lumbricoides var. Suis	Heavy
„ ..	Kidney	Stephanurus dentatus	Light
Sheep ..	Stomach	Hæmonchus contortus	Heavy
„ ..	Caecum	Trichuris ovis	Moderate
„ ..	Large Intestine	Oesophagostomum venulosum	Very heavy
Horse ..	Faeces	Oxyuris equi	Heavy
Hen ..	Eye	Oxyspirura mansoni	Light
„ ..	Intestine	Raillietina echinobothridia	Heavy
„ ..	„	Ascaridia galli	Heavy

EXTERNAL PARASITES

Host	Name of Parasite	Degree of Infestation
Cow ..	Solenopotes capillatus (little blue cattle louse)	Light
„ ..	Margaropus australis .. (cattle tick)	Heavy
„ ..	Stomoxys calcitrans .. (stable fly)	Very heavy
Hen ..	Menopon gallinæ (L.) .. (shaft louse)	Heavy
„ ..	Goniodes gigas (Tasch.) (fluff louse)	Heavy
„ ..	Lipeurus tropicalis .. (Peters) (head louse)	Heavy
„ ..	Argas mineatus .. (fowl tick)	Very heavy

In the treatment and control of most of the internal parasites Phenothiazine was very successful, implemented by suitable pasture management. Excellent results were obtained in the control of the cattle tick and stable fly with the use of Gammatox paste dip as a direct spray on the animals at weekly intervals for as long a period as necessary.

(9) Ketosis

This metabolic disorder was observed in three cases (dairy cows) and one case in a sow, all shortly after parturition. The condition most probably occurs in goats (does) also, although no clinical cases were seen.

(10) Nutritional Roup (Vitamin A deficiency)

Several cases of this condition were observed in growing chickens—the clinical symptoms and post-mortem findings were most definite, and a chemical examination of the mash being fed (imported) disclosed this to be entirely lacking in precursors of Vitamin A. This latter finding is of importance to local poultry breeders and raises the point as to the non-stability of this Vitamin A in mixed feeds, and the need for providing supplementary Vitamin A rich constituents such as fish oils, yellow corn, especially during dry spells when there is a resulting shortage of green fodder.

Animal Legislation

There was one Legislative Order made by the Governor-in-Executive Committee on the 21st day of October, 1948, prohibiting the importation of livestock and livestock products from the Leeward Islands due to an outbreak of Anthrax in that area.

In keeping with recommendation 4 made by the British West Indian Veterinary Conference (1947), the existing animal legislation in the island was reviewed, and draft proposals submitted to bring this up to date, using the Jamaican legislation as a basis, so as to ensure greater uniformity in this type of legislation within the British West Indian territories.

The following relevant statistical information is appended:—

TABLE I.

Animals Imported — Veterinary Inspection on Arrival

Horses	Mules	Asses	Cattle	Swine	Goats	Dogs	Total
30	24	20	2	2	2	44	124

TABLE II

Animals Exported — Veterinary Inspection Prior to Export

Horses	Mules	Cattle	Sheep	Goats	Cats	Dogs	Total
55*	19	1	18	40	3	47	183

* Includes intercolonial movement of racehorses

TABLE III

Numbers and Classes — Government Owned Livestock

Horses	Mules	Asses	Cattle	Swine	Goats	Sheep	Poultry	Total
30	8	6	146	134	43	43	128	538

TABLE IV

Laboratory Services

Class of Specimen	Nature of Examination	Number
Urine (mare)	Pregnacy diagnosis	10
Milk (cow)	Mastitis	609 samples
Blood (bovine)	Brucellosis	120 „
Blood (poultry)	Pullorum disease	480 „
Blood smears	Protozoa	6 films
Faeces	Parasitic Ova	10 stools
Seminal fluid	Micro-seminal examination	20 tests

SECTION X

FISHERIES

By

D. W. WILES,
Fishery Officer

During the period under review the activities of the Fisheries Division may be grouped as follows :—

A. The issuing of loans to fishermen and other boat owners for the construction and repair of boats.
B. The registration of the fishing fleet.
C. The construction of a Fisheries Experimental Boat.
D. The establishment of a Fisheries Experimental Station.
E. Improvements at beaches.
F. Beach rights.
G. Marketing and distribution.
H. General.

A. Loans to Fishermen

During the year one hundred and fifty-three applications for loans were sanctioned by the Fisheries Advisory Committee; sixteen of the applications were for the building of new boats. These applications involved a sum of $14,885.09, which brings the total amount now sanctioned by the Committee to $77,790.65. Actual expenditure in loans during the year amounted to $17,159.73, making a total of $73,216.90 actually loaned to date.

Repayments for the year totalled $7,771.77 and interest collected was $113.46. These sums bring the total amounts repaid to $34,742.04, with $422.56 of interest collected to date.

A further sum of $14,400.00 was voted by the Legislature during the year; this makes a total of $84,240.00 now voted by the Legislature for issuing of loans to fishermen.

B. The Registration of the Fishing Fleet

The registration of fishing boats was carried out in accordance with the conditions of the Fishing Industry Control Act, 1947, and the following schedule shows the number of boats of all types now engaged in the fishing industry :—

Parish	Boats over 20 feet	Boats under 20 feet	Pot & Sea Egg Boats	Canoes	Total
St. Michael	120	37	20	8	185
Christ Church ..	54	46	52	—	152
St. Philip	62	52	43	—	157
St. John	11	23	4	—	38
St. Joseph	4	31	2	—	37
St. Lucy	57	16	28	—	101
St. Peter	33	13	55	—	101
St. James	64	28	91	—	183
Totals	405	246	295	8	954

B. Construction of Fisheries Experimental Boat

Work was started on the construction of the Fisheries Experimental Boat in the month of July, 1948. This boat, which is 43 ft. long with a beam of 13 ft., is for the purpose of carrying out experiments with modern fishing gear and tackle for introduction locally. It will also be used for the purpose of charting and exploring new fishing banks as well as observation of the currents and habits of fish around the island. This boat is being built by local labour under the supervision of the Fishery Officer, after efforts to have it built on contract failed. It is expected that the boat will be launched in August.

D. Establishment of a Fisheries Experimental Station

Buildings recently owned by Messrs Cable and Wireless, Limited, situated on the northern section of the Reef grounds, St. Michael, have been acquired and work is already in progress on the renovating of the buildings and enclosing of the grounds towards making it suitable for the housing of the proposed Fisheries Experimental Station.

E. Improvement at Beaches

Efforts are being made to improve conditions at beaches, and to date fish sheds have been erected at Martins Bay and Consett's Bay in St. John, Skeete's Bay, St. Philip, and Reid's Bay, St. James.

A tractor with a Hyster winch attachment has been purchased for the hauling in of boats at Bathsheba, and plans for the building of a garage and gear room are going forward to implement this scheme.

Sets of hauling up gear have been established at points where fishing is carried on during the hurricane season for emergency hauling up work.

F. Beach Rights

Negotiations are underway for the purchase of land at Paynes Bay, St. James, and Sherman's, St. Peter, to be reserved in the interest of the fishing industry.

G. Marketing and Distribution

Plans have been prepared for the erection of Fish Markets at Oistins and Speightstown. Construction of the Fish Market at Oistins is already underway.

Returns from the Bridgetown Fish Market show an amount of 215,620 lb. of fish marketed during appointed hours (7.00 a.m. to 6.00 p.m.) for the year under review. This shows an increase of 26,226 lb. over the previous year. These returns make it possible to arrive at an estimated value of the Island's fisheries of $853,812.00 for the current year (1948-49). This shows an increase of $82,510.00 over last year's catch.

With the establishment of the four beach sheds which are used as rural markets, returns show that 68,884 lb. of fish have been landed at these four beaches from 1st January to 31st March, 1949.

H. General

(a) *Visit of Dr. C. F. Hickling, Secretary of State's Adviser on Colonial Fisheries.* Dr. C. F. Hickling arrived in Barbados on 31st January, 1949, and was shown over the several activities of the Department. He was taken to many of the main fishing villages and contacted the fishermen. Visits were made to the Bridgetown Fish Market, Boat Yard, proposed Experimental Station at Reef Grounds, and the Barbados Museum, where most of the fish life of the Island

can be seen in plaster cast. Dr. Hickling was also taken out in a flying fish boat to see the conditions for himself.

Before leaving, Dr. Hickling met the members of the Fisheries Advisory Committee at a meeting specially called for that purpose, and offered certain suggestions. Dr. Hickling's official report is awaited in order to pursue further his recommendations. On the whole, Dr. Hickling expressed satisfaction.

(b) *Insurance of Boats.* Insurance of boats continues to be more generally accepted by the boat owners, especially after the Fisheries Advisory Committee decided to extend loans to cover insurance, and to date one hundred and sixty-two boats have been insured, of which one hundred and forty-eight were covered through the loan scheme.

To date eight claims for total loss and salvage expenses have been made, totalling $2,848.40.

(c) *Loss of Fishermen and Boats.* During the year twelve boats were lost. Two were driven ashore after breaking their moorings and wrecked, seven sank at sea, two were missing from their moorings, and one sank between the reefs. As a result of these accidents, it is regretted that seven fishermen lost their lives.

Another fisherman was drowned at Bathsheba on 31st January; on this occasion it was said that Bathsheba had its highest seas in fifty years. Seven boats received damage, and it was only due to the heroism of some of the men that more boats and lives were not lost.

A public subscription was raised by Mr. J. F. Barritt on behalf of the distressed. This subscription covered all boat expenses.

(d) *Meetings of Fisheries Advisory Committee.* During the year there were five meetings of the Fisheries Advisory Committee, at which various matters affecting the welfare of the fishing industry were discussed. Chief among these were —

(i) Granting of loans to fishermen.

(ii) Reviewing of financial statements submitted by the Fishery Officer.

(iii) Construction of the Fisheries Experimental Boat.

(iv) Removal of Customs Duty from certain articles used in connection with the fishing industry.

(v) Acquisition of land at various points for the erection of beach shelters and hauling-up facilities.

(vi) Blasting of Channels.

(e) *Fisheries display at Annual Exhibition.* At the request of the Governor, Sir Hilary Blood, the Department was asked to present to the public a stall which would in some way bring before them the Island's fishery.

A display was duly put on by the Fishery Officer and his assistants. This met with His Excellency's approval, together with encouraging comments from members of the public who took an interest in reviewing the several phases of the developments presented in this booth.

CO-OPERATION

By

J. M. CAVE,
Co-operative Officer.

Co-operative Legislation

The main task of the Co-operative Officer during the year has been the preparation and arrangement of a draft Bill for the encouragement, protection and control of co-operative societies in Barbados. The proposed legislation is based on the Model Co-operative Societies Ordinance submitted by the Colonial Office to all colonial Governments in 1946.

The preparation of legislation also involved the preparation of details for the organisation required to carry out its provisions when it has been enacted.

Co-operative Adviser's Visit

Mr. J. B. Surridge, O.B.E., Adviser on Co-operation to the Secretary of State for the Colonies, paid a visit to Barbados in December, 1948. The opportunity was taken to discuss with him the proposed legislation and various other matters affecting the development of co-operatives here.

During his stay, Mr. Surridge accompanied the Deputy Director and the Co-operative Officer on visits to some of the chief peasant areas in order to obtain a picture of existing conditions and suggest ways in which co-operation could best help small farmers.

Co-operative Training

The Co-operative Officer ran a short course on co-operation for the newly appointed Peasant Agricultural Instructors, who will be required to use the knowledge thus gained in the carrying out of this important aspect of the extension work of the Department.

Two Peasant Agricultural Instructors have since been singled out and are undergoing intensive training in co-operative work. These officers will be fitted to carry out the duties required for the effective operation of the proposed legislation.

Meetings

The Co-operative Officer took an active part in three of the "Peasant Farmers' Days" held at the various Agricultural Stations during the year. At these meetings of small farmers, he outlined the main features of 'co-operation' and suggested ways in which co-operatives could meet their mutual needs.

Twenty-four other meetings were attended by the Co-operative Officer at which co-operation, its principles, organisation and functions were explained and discussed.

The above does not include numerous discussions with small groups of individuals and committees of embryonic co-operative societies on matters of detail affecting the practical operation of their societies.

Co-operative Societies

The St. Silas Men's Co-operative continued to flourish and has widened its activities to embrace the butchering of pigs raised by its members. This society continued to obtain its fertilizers and stock feeds co-operatively.

The Shamrock Credit Union, started by a group from St. Patrick's Roman Catholic Church, has made rapid progress and loans to members have grown in number and value. The supervision of loans, for necessary purposes, has been of a very high standard and no difficulties have occurred with respect to repayment, and so long as this standard is maintained, the usefulness of the society will thrive and develop.

The above society has sponsored but does not control a "Buying Club" at which fruit and other goods with a ready sale are purchased in bulk and retailed to members. Bonus on purchases are being distributed quarterly.

There are two groups of peasants who have organised co-operatively during the year but their activities have not yet had time to develop.

Peasant Groups

During the previous year attempts were made to organise groups of peasants for the purchase of their fertilizer requirements, and eighteen such groups, requiring fifty-six tons of fertilizers, were organised. This Department served as intermediary between the groups and the suppliers.

In the year under review this procedure was enlarged and arrangements were made for the groups to deal directly with the merchants. Thirty-three groups were formed, involving a membership of six hundred and total requirements of one hundred and twenty-five tons of fertilizer.

There are also five similar groups obtaining their stock feed supplies in a similar manner.

These co-operative efforts serve the purpose of demonstrating the advantages of collective action but so far, however, none of these loosely organised groups can be considered co-operative societies.

Co-operative Visitors

The Co-operative Officer was privileged to have visits from Fr. Ellis of British Guiana, who is doing much to extend the development of co-operation there, and from Fr. J. P. Sullivan of the St. George's Extension School in Jamaica, who is recognised as having the widest experience and knowledge of the co-operative movements of the U.S.A. and Canada, and who has for the past decade devoted his energies to co-operative development throughout the Caribbean area.

EXPERIMENTAL COTTON SPINNING PLANT

By

N. A. PHILLIPS,
Manager.

After spinning 24's count ring yarn continuously for almost a year, the demand for a type of cord suitable for wrapping light parcels caused the machines to be geared and adjusted to spin 10's count ring yarn. Over 6,000 lbs. of this yarn were produced in the three months ending 15th July, 1948, and most of it has been made into soft twisted five-ply 10's cord. By the beginning of August, the Plant was on its normal job of spinning 24's yarn. Two weeks later, the Plant was closed for fourteen days' vacation, and on re-opening, the machines were operated at maximum capacity until December when, owing to the non-arrival of expected supplies of raw cotton, production was halved. This step was taken to ensure that the Plant should not have to be closed through lack of raw material—an enforced period of idleness would have had an adverse effect on both the machines (rust) and the staff (loss of skill).

Experiments were conducted to determine the possibility of producing special types of cord, e.g. cord for sewing bags by machine. Indications are very favourable, and the arrival of accessories for coning this cord is anxiously awaited.

Machinery

The machines have functioned very satisfactorily during the year, seldom requiring more than routine attention. During September, however, it became obvious that the top leather-covered draft rollers of the Drawing, Slubbing, Roving and Spinning Frames needed complete re-conditioning. This entailed removing firstly the old leather covers, secondly the doeskin that had lost its resilience (cushion), thirdly the special flour paste that holds the doeskin in position, and finally all signs of rust from the new denuded iron roller.

The first step in re-covering the rollers is to prepare a paste of flour, water, resin, spirits of turpentine and boiled linseed oil. This paste takes about thirty hours to make and spoils in about forty-eight hours. The second step is to cut the doeskin (from a bolt of it) into accurate rectangles. A wooden mallet and keen-edged chisel, similar to that used by carpenters but having an eight-inch cutting edge, are used to do the cutting. The paste is then spread thinly and evenly on the rectangles of doeskin, which are then applied to the iron rollers so that the joint cannot be detected by touch.

A total of 360 rollers were re-conditioned in three weeks by the Manager, assisted by one of the female tenters who shows a definite aptitude for work of this type. This tenter does all the re-covering with leather and varnishing, in addition to her normal duties.

Staff

No changes have been made on the staff and their work, attendance and enthusiasm are very satisfactory.

Production

Production during the year amounted to 5,413 lb. of five-ply 10's cord—2,667 lb. have been sold, and 6,046 lb. of 24's ring yarn—5,568 lb. have been sold.

PART IV.

FINANCIAL STATEMENT

Expenditure and Revenue for the Financial Year 1948-49

EXPENDITURE

Personal Emoluments	$ 70,799.98
Travelling Allowances	12,625.38
Exhibition Expenses	717.50
Expenses in Control of Cotton Diseases (Salaries of Sub-Inspectors)	1,254.20
Unforeseen Contingencies	240.36
Extra Clerical Assistance	654.00
Stationery	679.42
Library	425.62
Destruction of Rats and Beetles	1,044.00
Insurance of Livestock	274.32
Experiment Stations and Botanic Station	32,916.44
Chemical Laboratory	4,019.22
Entomology	12,548.88
Science Teaching at Harrison College	8,703.12
Analyses of Commercial Sugars	1,874.18
Upkeep of Government Lands	—
Fishery Development	1,793.04
Cost of Living Allowance	18,216.64
	$168,786.30

REVENUE

Sale of Ornamental and useful Plants	$ 718.69
Sale of Produce from Codrington Experiment Station	3,214.89
Fees for Analyses of Sugars and Molasses	4,583.76
Fees for Analyses of Miscellaneous Samples &c.	258.48
Sale of Vegetable Seeds, Insecticides, used Wheat &c.	6,900.82
Miscellaneous Receipts	445.90
Deposits on Pots	198.48
Fumigation of Bags &c.	81.90
	$ 16,402.92

PART V.

AGRICULTURAL LEGISLATION

1. Act 1948—21. 28th August, 1948.

The Cotton Export Levy (Amendment) Act, 1948.

This Act amends Section 3 of the principal Act by repealing the words "not exceeding one half-penny per pound" occurring therein.

2. 21st October, 1948.

An Order made by the Governor-in-Executive Committee under the Trade Act, 1910.

This Order prohibits the importation of animals, poultry, carcasses, litter and fodder from the Leeward Islands, owing to reported cases of Anthrax in Nevis and St. Kitts.

3. 1949—6. 19th February, 1949.

The Sugar Industry (Rehabilitation, Price Stabilization and Labour Welfare) (Amendment) Act, 1949.

This Act permits the investment of assets of the Rehabilitation Reserve Fund, the Price Stabilization Reserve Fund and the Labour Welfare Fund.

PART VI.

LIST OF PUBLICATIONS ISSUED BY THE DEPARTMENT OF SCIENCE AND AGRICULTURE AND B.W.I. CENTRAL SUGAR CANE BREEDING STATION FROM 1925 TO DATE.

Department of Science and Agriculture

Reports :

Report on the Sugar Cane Experiments for the Season between 1923—25, by J. P. D'Albuquerque, M.A., F.I.C., F.C.S.

Report on the Sugar Cane Experiments for the Season between 1924—26, by J. P. D'Albuquerque, M.A., F.I.C., F.C.S.

Report on the Department of Agriculture, Barbados, 1925—26.

Annual Report of the Department of Agriculture, 1926—27.

Report of the Department of Agriculture, Barbados, 1927—28.

Annual Report of the Department of Science and Agriculture, 1928—29.

Annual Report of the Department of Science and Agriculture, Barbados, 1929—30.

Report of the Department of Science and Agriculture, Barbados, 1930—31.

Agricultural Journals :

Vol. 1 No. 1, Jan. 1932 (out of print)	An Investigation into the Evolution of Sugar Cane Varieties by Breeding in Barbados, 1887-1925, with a discussion on the application of the Findings to the present day Scheme of Work, by A. E. S. McIntosh, B.Sc., Ph.D.
	A Survey of the Position of *Phytalus smithi*, Arrow, and its Natural Enemies in Barbados, by R. W. E. Tucker, M.A., B.Ed.
	The Scientific Control of Pan Boiling, by S. J. Saint, M.Sc., Ph.D.
	The Status of *Trichogramma* as a control of *D. saccharalis* in Barbados, by R. W. E. Tucker, M.A., B.Ed.
	The Inversion of Sucrose in Syrup Manufacture, by C. A. Coppin, B.A.Sc.
	Some Aspects of the Flora of Barbados, by F. Hardy, M.A., F.G.S.
	Memorandum on the Cotton Situation in Barbados.
Vol. 1 No. 3, April 1932	Report on the Work of the Department of Science and Agriculture for the Year Ending June 30, 1932.
	Some Aspects of the Flora of Barbados (Cont'd.) by F. Hardy, M.A., F.G.S.
Vol. 1 No. 3, July 1932	Report of the Geneticist for 1931—32.
	Some Aspects of the Flora of Barbados, by F. Hardy, M.A., F.G.S.
Vol. 1 No. 4, Oct. 1932	A Discussion of the Results of Manurial Trials carried out on Sugar Cane in Barbados, 1928-32.
	Some Aspects of the Flora of Barbados, by F. Hardy, M.A., F.G.S.
Vol. 2 Nos. 1 & 2, April 1933	Report on the Work of the Department of Science and Agriculture for the Year Ending June 30, 1933.
	Some Aspects of the Flora of Barbados (Concluded) by F. Hardy, M.A., F.G.S.
Vol. 2 No. 3, July 1933	Report of the Geneticist for the Year 1932—33.

Vol. 2 No. 4, October 1933	Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D.
	Rate of Egg Deposition of *D. saccharalis* and Extent of Larval Mortality in Canefields and their relation to Control of *Diatraea* by *T. minutum*, by R. W. E. Tucker, M.A. B.Ed.
	Varietal Factors in Cane which may influence extent of Oviposition by *D. saccharalis* and a possible method for Determining Varietal Susceptibility to Borer attack, by R. W. E. Tucker, M.A., B.Ed.
Vol. 3 No. 1, January 1934	Sugar Cane Growth Measurements in Barbados, by A. E. S. McIntosh, B.Sc., Ph.D.
	A Contribution towards the Solution of the Problem of Control of the real mortality of *D. saccharalis* due to egg parasites, egg predators, natural larval mortality, larval parasitism and other factors, by R. W. E. Tucker, M.A., B.Ed.
Vol. 3 No. 2, April 1934	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st, 1934.
Vol. 3 No. 3, July 1934	The Coral Limestone Soils of Barbados. by S. J. Saint. M.Sc., Ph.D
Vol. 3 No. 4, October 1934	Report of the Geneticist for the Year 1933-34.
	A further Contribution to the Analysis of Field Data on *D. saccharalis* in Barbados, by R. W. E. Tucker, M.A., B.Ed.
Vol. 4 No. 1, January 1935 (out of print)	Manurial Trials with Sugar Cane.
	The Control of *D. saccharalis* in Sugar Cane in Barbados by frequent liberation of mass—reared *Trichogramma*, by R. W. E. Tucker, M.A., B.Ed.
Vol. 4 No. 2, April 1935	Report on the Work of the Department of Science and Agriculture for the Year ending March 31st 1935.
Vol. 4 No. 3, July 1935	Report of the Geneticist for the Year 1934-35.
Vol. 4 No. 4, Oct. 1935	Manurial Trials with Sugar Cane.
	Sugar Cane. A Summary of Plantation Variety Yield Returns for Season 1933-35, by A. E. S. McIntosh, B.Sc., Ph.D.
	Juice Analyses in Relation to the Fertilizer Requirements of Barbados Soils, by S. J. Saint, M.Sc., Ph.D.
Vol. 5 No. 1, January 1936 (out of print)	Parasites Introduced into Barbados for Control of Insect Pests, R. W. E. Tucker, M.A., B.Ed.
	Investigations into the Use of the Zeiss Hand Refractometer, by A. E. S. McIntosh, B.Sc., Ph.D., and G. C. Stevenson, B.A.
Vol. 5 No. 2, April 1936	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st, 1936.
Vol. 5 No. 3 July 1936	The Yield of Sugar Cane in Barbados in 1936. Report of the Botanist for the Year 1935—36.
Vol. 5 No. 4, October 1936 (out of print)	A Preliminary Investigation into Cane Varieties and Infestation by *D. saccharalis*, by R. W. E. Tucker, M.A. B.Ed.
Vol. 6 No. 1, January 1937 (out of print)	Manurial Trials with Sour Grass, by S. J. Saint, M.Sc., Ph.D.
	Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D.
	Sugar Cane Spacing Experiments, by G. C. Stevenson, B.A.

Vol. 6 No. 2, April 1937 (out of print)	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st, 1937.
Vol. 6 No. 3, July 1937	The Yield of Sugar Cane in Barbados, 1937. Report of the Botanist for the Year 1936—37.
Vol. 6 No. 4, October 1937 (out of print)	The Control of Scarabee in Barbados, by R. W. E. Tucker, M.A., B.Ed. Larval Dispersion of *D. saccharalis*, by R. W. E. Tucker, M.A., B.Ed.
Vol. 7 No. 1, January 1938	Manurial Trials with Sugar Cane, by S. J. Saint, M.Sc., Ph.D. An Account of an Experiment to Determine the Efficiency of two Weed-killing Sprays. Experiments with the Dwarf Banana. String Bean Variety Trial, Codrington, 1937. Experiments in the Use of Hortomone A to Stimulate Rooting and Establishment in Cuttings of Ornamental Plants.
Vol. 7 No. 2, April 1938 (out of print)	Report on the Work of the Department of Science and Agriculture for the Year Ending March 31st, 1938
Vol. 7 No. 3, July 1938	The Yield of Sugar Cane in Barbados in 1938. Report on Sugar Cane Breeding and Seedling Testing for the Year 1937—38, by A. E. S. McIntosh, B.Sc., Ph.D.
Vol. 7 No. 4, October 1938 (out of print)	Experiments in the Growing of Tomatoes and Shipment to Canada. Co-operative Sugar Cane Spacing Experiments. Sweet Potato Storage Experiments.
Vol. 8 No. 1, January 1939	Manurial Trial with Sea Island Cotton, by S. J. Saint, M.Sc., Ph.D. Cotton Growing and Cotton Pests Control, by R. W. E. Tucker, M.A., B.Ed. The Control of *D. abbreviatus*, L. and *L.* (*Phytalus*) *smithi*, Arrow, in Barbados, surveyed over a period of eleven years, by R. W. E. Tucker, M.A. B.Ed.
Vol. 8 No. 2, April 1939	Report on the Work of the Department of Science and Agriculture for the Year Ending 31st March, 1939.
Vol. 8 No. 3, July 1939	The Yield of Sugar Cane in Barbados in 1939. Report on Sugar Cane Breeding and Seedling Testing for the Year 1938—39, by A. E. S. McIntosh, B.Sc., Ph.D.
Vol. 8 No. 4, October 1939	Introduction, by R. W. E. Tucker, M.A., B.Ed., of Dry Area Race of *M. minense* into Barbados. The Termites of Barbados, by R. W. E. Tucker, M.A., B.Ed. *Bufo Marinus*, L. in Barbados, by R. W. E. Tucker, M.A. B.Ed.
Vol. 9 No. 1, January 1940	Manurial Trials with Sugar Cane, by C. B. Johnston, B.Sc.

Annual Report of the Department of Science and Agriculture for the Year 1940—41.
Annual Report of the Department of Science and Agriculture for the Year 1941—42.
Annual Report of the Department of Science and Agriculture for the Year 1942—43.
Annual Report of the Department of Science and Agriculture for the Year Ending 31st March, 1944.
Annual Report of the Department of Science and Agriculture for the Year 1944—45.
Annual Report of the Department of Science and Agriculture for the Year 1945—46.
Annual Report of the Department of Science and Agriculture for the Year 1946—47.
Annual Report of the Department of Science and Agriculture for the Year 1947—48.

Pamphlets (New Series):

No. 1, Jan. 1941	Garden Pests of Local Importance.
No. 2, Jan. 1941	Manuring of Crops.
No. 3	The Identification and Treatment of the Common Diseases of the Chief vegetable crops
No. 4	Compost Making.
No. 5 (out of print)	Rabbit Keeping in Barbados.
No. 6, August 1942	The Care and Maintenance of the Milch Goat in Barbados.
No. 7	The Growing of Food Crops.
No. 8	Hints to Cotton Growers.
No. 9, October 1942	The Selection and Storage of Seed Corn in Barbados.
No. 10, Oct. 1942	(1) Possible Means for an Efficient Use of a Large Sweet Potato Crop (2) War-time Rations for Livestock. (3) The Storage of Sweet Potatoes in Clamps.
No. 11, Nov. 1942	Ways of Cooking Sweet Potatoes.
No. 12 (out of print)	Recipes for the Use of Local Foodstuffs.
No. 13	Recipes for the Use of Cassava Flour.
No. 14, Nov. 1945	The Use of D.D.T. in Barbados.
No. 15, Oct. 1947	Contour Farming.
No. 16, Dec. 1948	Contour Cultivation in Barbados.

Bulletins (New Series):

No. 1, Jan. 1944	Inventory of the Barbados Rocks and their Possible Utilization, by Alfred Senn, Ph.D.
No. 2, August 1944	The Culture of Garden Vegetables in Barbados, by D. M. Hanschell, B.Sc
No. 3	Notes on West Indian Hurricanes with Special Reference to Barbados by C. C. Skeete, B.A.
No. 4, May 1945	Manurial Trials with Food Crops, by F. H. B. Blackburn, B.Sc.
No. 5, October 1945	The Yield of Sugar Cane in Barbados in 1945, by C. B. Foster.
No. 6, Jan. 1946	Sugar Cane and its Cultivation in Barbados, by C. B. Foster.

No. 7, July 1946 — Manurial Trials with Sugar Cane in Barbados, by F. H. B. Blackburn B.Sc., A.R.I.C.

No. 8, July 1946 — The Yield of Sugar Cane in Barbados in 1942, by C. B. Foster.

No. 9 — The Yield of Sugar Cane in Barbados in 1946, by C. B. Foster

No. 10, August 1947 — The Yield of Sugar Cane in Barbados in 1947, by C. B. Foster.

No. 11, Oct. 1947 — Peasant Agriculture in Barbados, by M. Halcrow, B.Sc., A.I.C.T.A., and J. M. Cave, D.I.C.T.A.

No. 12, July 1948 — The Yield of Sugar Cane in Barbados in 1948, by C. B. Foster.

British West Indies Central Sugar Cane Breeding Station.

Reports:

Report on the British West Indies Central Sugar Cane Breeding Station for the Period Ending September 30th, 1934.
Report for the Year Ending September 30th, 1935.
Third Annual Report Ending September 30th, 1936.
Fourth Annual Report Ending September 30th, 1937.
Fifth Annual Report Ending September 30th, 1938.
Sixth Annual Report Ending September 30th, 1939.
Seventh Annual Report Ending September 30th, 1940.
Eighth Annual Report Ending September 30th, 1941.
Ninth Annual Report Ending September 30th 1942.
Tenth Annual Report Ending September 30th, 1943.
Eleventh Annual Report Ending September 30th, 1944.
Twelfth Annual Report Ending September 30th, 1945.
Thirteenth Annual Report Ending September 30th, 1946.
Fourteenth Annual Report Ending September 30th, 1947.

Bulletins:

No. 1, Sept. 1933 — Report on the Sugar Cane Breeding Problems of Antigua, Trinidad and St. Kitts, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.

No. 2, June 1934 — Report on the Sugar Cane Variety Problems in St. Lucia derived from a Visit during April, 1934, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.

No. 3, Sept. 1934 — Report on a Visit to Jamaica, June 1934, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.

No. 4, Nov. 1934 — Report on a Visit to Grenada, by A. E S. McIntosh, B.Sc., Ph.D., Geneticist.

No. 5, Feb. 1935 — Investigations into the Root Development of Sugar Cane in Barbados. (i) Root Development in several Varieties under one Environment, G. C. Stevenson, B.A., A.I.C.T.A., Assistant Botanist, and A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.

No. 6, June 1935 — An Account of the Policy and Methods Employed in the Breeding and Initial Stage of selecting Sugar Cane Seedlings, by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist.

No. 7, July 1935 — Report on a Second Visit to Antigua, April 1935 by A. E. S. McIntosh, B.Sc., Ph.D., Geneticist

No. 8, Aug. 1935 — Gumming Disease Investigations in Barbados by A. E. S. McIntosh, B.Ss., Ph.D. and G. C. Stevenson, B.A.

No. 9, Nov. 1935 — An Account of the Methods Employed in Testing and Selecting Sugar Cane Seedlings for Thick Cane Areas in the British West Indies, by A. E. S. McIntosh, B.Sc., Ph.D.

No. 10, Aug. 1936	The Yield of Sugar Cane in Barbados in 1936.
No. 11, Nov. 1936	Investigations into the Root Development of the Sugar Cane in Barbados. (ii) Further Observations on Root Development in several Varieties under one Environment, by G. C. Stevenson, B.A.
No. 12, April 1937	Sugar Cane Fuzz Storage Experiments.
No. 13, June 1937	Report on a Second Visit to Grenada, April 1937, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 14, June 1937	A Botanical and Agricultural Description of Recently Produced Commercial Seedlings, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 15, July 1937	Report on a Visit to St. Kitts and Antigua, June 1937, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 16, July 1937	(i) Studies on Gumming Disease of Sugar Cane; (ii) Investigations into the Use of the Zeiss Hand Refractometer, by G. C. Stevenson, B.A.
No. 17, Aug. 1937	The Yield of Sugar Cane in Barbados in 1937.
No. 18, June 1938	Studies in the Use of the Zeiss Hand Refractometer. (ii) The Zeiss Hand Refractometer as an Indicator of Ripening in Sugar Cane, by A. E. S. McIntosh and G. C. Stevenson.
No. 19, Nov. 1938	Report on a Second Visit to Jamaica, October 1938, by A. E. S. McIntosh. B.Sc., Ph.D.
No. 20, Jan. 1939	The Yield of Sugar Cane in Barbados in 1938.
No. 21, Sept. 1939	The Yield of Sugar Cane in Barbados in 1939
No. 22, Nov. 1940	Report on a Third Visit to Jamaica, October 1940, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 23, Sept. 1941	The Yield of Sugar Cane in Barbados in 1940.
No. 24, July 1942	The Yield of Sugar Cane in Barbados in 1941.
No. 25, Jan. 1944	The Yield of Sugar Cane in Barbados in 1943.
No. 26, May 1944	A. Report on a Fourth Visit to Jamaica, Jan.—Feb. 1944, by A. E. S. McIntosh, B.Sc., Ph.D. B. Sugar Cane Mosaic Disease in Jamaica and Barbados, by B. deL. Inniss, B.Sc. C. Report on a Visit to Trinidad, February 1944, by A. E. S. McIntosh, B.Sc., Ph.D.
No. 27, Nov. 1944	Report on a Visit to British Guiana, July and August 1944, by A. E. S McIntosh, B.Sc., Ph.D.
No. 28, Oct. 1944	The Yield of Sugar Cane in Barbados in 1944.
No. 29, Nov. 1947	Report on a Visit to Jamaica, September—October 1947, by B. deL Inniss, B.Sc.

METEOROLOGICAL OBSERVATIONS RECORDED AT THE METEOROLOGICAL STATION, CODRINGTON

Height Above Sea Level 181 Feet.
Latitude 13° 7′ 36″ N. Longitude 50° 35′ 57″ W.

The following are the summaries of the observations recorded for the year 1948. The details are given in Appendix II.

Barometric Pressure. The records refer to observations made at the hours of 9.00 a.m. and 3.00 p.m. only and are expressed in inches of mercury. During the year 1948, the mean pressure corrected for temperature and gravity and reduced to sea-level was at 9.00 a.m. 29.980, and at 3.00 p.m. 29.909; the highest pressure recorded being 30.082 on the 16th of February and the lowest being 29.757 on the 25th of September. For the ten year period 1938—1947 the average barometric pressure was at 9.00 a.m. 29.981 and at 3.00 p.m. 29.909. The highest pressure recorded at 9.00 a.m. during the ten year period was 30.121 on the 21st of February, 1946, and the lowest pressure recorded at 3.00 p.m. was 29.658 on the 12th of November, 1946.

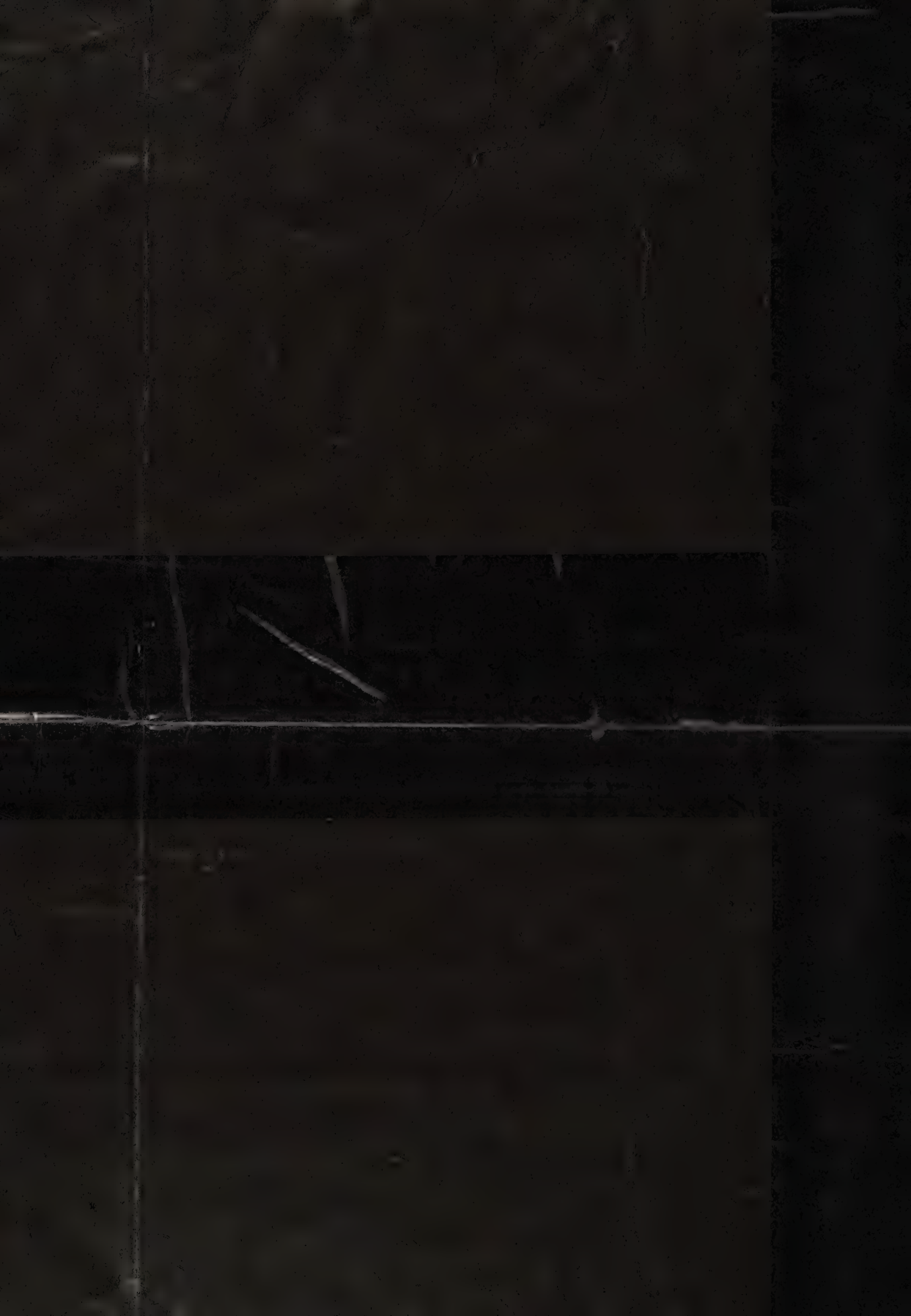
Temperature. The daily mean maximum temperature for the year 1948 was 85.3° F. and the daily mean minimum 72.5° F. The maximum extreme for the year was 91.0 °F. registered on the 29th of May and the minimum extreme was 64.5° F. registered on the 18th and 19th of January. The average monthly mean temperature was 78.9° F., the highest monthly range 23.0 °F. and the lowest 15.5 °F., the mean monthly range being 19.1 °F. For the ten year period 1938-1947 the daily mean maximum was 85.3° F. and the daily mean minimum 72.0° F. During the ten year period the average monthly mean temperature was 78.6 °F., the maximum extreme was 95.0 °F. on the 21st of August, 1943, the minimum extreme 60.5° F. on the 29th of February, 1944, and the average monthly range 19.2° F.

Tension of Vapour and Relative Humidity. The mean tension of vapour for the year 1948 was at 8.00 a.m. .762 and at 4.00 p.m. .721. The mean relative humidity was at 8.00 a.m. 74.5 per cent and at 4.00 p.m. 65.5 per cent.

Wind. The daily (24 hour period) mean velocity of the wind during the year 1948 was 8.6 miles an hour. Records were kept of half-daily or twelve-hour periods from 6.00 a.m. to 6.00 p.m. and 6.00 p.m. to 6.00 a.m. The maximum velocity for any such twelve-hour period was 24.6 miles an hour, recorded between 6.00 a.m. and 6.00 p.m. on the 12th of March and the minimum velocity 0.4 miles per hour recorded between 6.00 p.m. and 6.00 a.m. on the 16th of August. The average daily (24 hour period) velocity for the ten years ended 1947 was 9.9 miles an hour.

Rainfall. The rainfall measured at the Government Meterological Station (Codrington) during the year 1948 amounted to 57.97 inches. Rainfall was recorded on one hundred and eighty-seven days, the greatest fall being 3.72 inches on the 25th of September. For the ten year period 1938-1947, the average total rainfall at Codrington was 47.50 inches and the average number of days annually on which rain fell was one hundred and eighty-five.

Rainfall of the Island. The average total rainfall for the year 1948 from sixty-two stations was 69.81 inches, being 10.08 inches above the average total for the hundred years ended 31st December, 1946, which was 59.73 inches.



MONTH	Mean Pressure Reduced to 32° F Latitude 45° and Mean Sea Level					Max. Mean
	9 a.m.	3 p.m.	Mean	Highest	Lowest	
January ...	29.991	29.912	29.951	30.060	29.830	84
February ...	30.015	29.939	29.977	30.082	29.835	84
March ...	30.012	29.936	29.974	30.053	29.860	85
April ...	29.989	29.901	29.945	30.069	29.838	86
May ...	29.973	29.903	29.938	30.005	29.846	87
June ...	30.003	29.945	29.974	30.038	29.880	86
July ...	29.977	29.926	29.951	30.024	29.854	85
August ...	29.964	29.901	29.932	30.049	29.838	86
September ...	29.948	29.876	29.912	30.030	29.757	85
October ...	29.950	29.870	29.910	30.028	29.820	85
November ...	29.943	29.865	29.904	30.029	29.797	83
December ...	30.002	29.907	29.954	30.055	29.876	82
TOTAL ...	359.767	358.909	359.322	360.522	358.031	1024
AVERAGE ...	29.980	29.909	29.944	30.043	29.836	85

APPENDIX II.

Meteorological Report for 1948.

TEMPERATURE °F							TENSION OF VAPOUR			RELATIVE HUMIDITY			Velocity Miles per Hour	Rainfall (Inches)	No. of Days on which Rain fell
	Min. Mean	Max. Extreme	Min. Extreme	Mean for Month	Range for Month	Dew Point 8 a.m.	Dew Point 4 p.m.	8 a.m.	4 p.m.	Mean	8 a.m.	4 p.m.	Mean			
.7	70.8	86.5	64.5	77.7	22.0	68.5	66.5	.706	.650	.678	74.3	60.9	67.6	9.5	2.54	15
.4	69.6	86.0	65.0	77.0	21.0	67.2	64.4	.670	.606	.638	70.5	55.7	63.1	10.2	1.03	10
.3	71.1	88.0	67.5	78.2	20.5	67.4	67.0	.676	.669	.672	69.7	63.9	66.8	11.5	1.70	12
.3	70.8	89.0	66.0	78.5	23.0	66.0	64.0	.640	.608	.624	60.9	53.3	57.1	9.2	0.22	3
.3	73.8	91.0	71.0	80.5	20.0	71.1	69.6	.763	.725	.744	70.3	60.9	65.6	9.3	3.14	17
.7	75.4	90.0	71.0	81.0	19.0	72.1	70.5	.790	.750	.770	72.9	64.8	68.8	10.0	5.31	18
.4	74.5	87.5	70.0	79.9	17.5	73.4	72.1	.821	.787	.804	77.9	71.7	74.8	10.3	6.87	28
.1	73.4	89.0	70.5	79.7	18.5	74.2	71.6	.844	.778	.811	78.7	68.9	73.8	5.8	8.72	15
.6	73.4	88.0	70.5	79.5	17.5	74.1	72.6	.839	.802	.820	79.3	71.2	75.2	5.7	10.18	18
.8	73.4	88.0	71.0	79.6	17.0	73.9	72.5	.836	.799	.817	78.8	71.1	74.9	4.8	4.73	15
.8	73.3	86.5	69.0	78.5	17.5	72.9	71.4	.816	.780	.798	82.1	76.1	79.1	7.4	10.36	24
.6	71.3	84.5	69.0	76.9	15.5	70.3	68.7	.740	.701	.720	79.0	68.4	73.7	9.4	3.17	12
.0	870.8	1054.0	825.5	947.0	229.0	851.1	830.9	9.141	8.655	8.896	894.4	786.9	840.5	103.1	57.97	187
.3	72.5	87.8	68.7	78.9	19.1	70.9	69.2	.762	.721	.741	74.5	65.5	70.0	8.6	4.83	16

APPENDIX III.

Barbados Rainfall from January to De

Name of Station	Number of Stations	January		February		March		April		May		June		
		Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days
District "A"—St. Michael														
Lowlands ...	6	15	2·06	8	1·17	14	2·63	2	0·28	14	3·02	17	5·12	24
District "B"—Christ Church														
Lowlands ...	6	11	2·94	7	1·02	13	2·08	1	0·45	12	2·09	17	4·06	22
—St. George														
Highlands ...	1	15	3·96	11	1·95	20	3·38	6	0·93	12	3·59	20	4·89	20
Lowlands ...	5	14	3·02	10	1·25	15	3·14	3	0·44	15	3·40	19	5·41	24
District "C"—St. Philip														
Highlands ...	2	14	3·28	6	0·74	11	2·96	4	0·47	11	2·60	16	3·49	24
Lowlands ...	7	14	2·82	7	0·79	11	2·78	2	0·65	12	2·04	17	4·48	22
—St. John														
Highlands ...	6	16	3·69	9	1·12	15	5·06	6	0·68	14	2·77	19	4·38	25
Lowlands ...	1	8	2·63	7	0·89	11	2·03	2	0·45	12	2·35	16	3·90	19
District "D"—St. Thomas														
Highlands ...	5	17	4·02	9	1·53	17	4·09	5	0·75	16	4·31	22	5·40	28
Lowlands ...	2	14	3·60	8	1·56	15	3·59	6	1·13	14	3·59	20	4·68	24
—St James														
Highlands ...	1	19	3·91	8	2·15	12	3·58	6	0·69	15	4·34	21	7·79	27
Lowlands ...	4	13	2·82	10	1·26	13	2·06	4	0·58	13	2·99	16	4·99	26
District "E"—St. Peter														
Highlands ...	1	10	1·19	7	0·80	9	1·36	3	0·18	12	1·80	17	6·23	27
Lowlands ...	4	11	2·99	7	1·63	8	1·73	3	0·32	12	2·18	16	6·39	23
—St. Lucy														
Lowlands ...	3	11	1·60	5	1·23	7	1·29	3	0·35	8	1·99	16	5·96	23
District "F"—St. Joseph														
Highlands ...	4	19	3·77	11	1·15	18	4·35	6	0·78	17	3·57	20	4·70	27
—St. Andrew														
Highlands ...	2	14	3·50	7	2·00	13	3·68	3	0·79	12	3·27	17	5·57	22
Lowlands ...	2	9	2·40	9	1·17	9	1·23	3	0·28	14	2·48	18	5·32	25
Totals	62	244	54·20	146	23·41	231	51·02	68	10·20	235	52·38	324	92·76	432
Average		13	3·01	8	1·30	13	2·83	4	0·57	13	2·91	18	5·15	24

cember, 1948.

July		August		September		October		November		December		TOTAL.	
Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	
7·31	16	9·13	15	9·88	12	4·96	22	11·26	13	3·31	172	60·13	
6·49	16	7·82	13	6·97	11	4·31	19	10·96	12	2·62	154	51·81	
10·32	19	12·70	17	15·02	16	9·91	19	12·65	15	4·54	190	83·84	
6·89	18	9·26	16	11·06	15	4·87	22	12·05	11	3·25	182	64·04	
7·77	20	9·34	18	12·35	15	6·87	21	12·39	13	4·23	173	66·49	
6·08	19	9·01	14	9·83	17	6·72	20	10·08	11	2·60	166	57·88	
9·14	20	11·16	19	11·50	17	8·14	22	11·47	15	4·46	197	73·57	
9·46	16	10·77	14	10·85	11	6·16	16	10·63	8	3·52	140	63·34	
12·23	21	13·93	17	12·54	15	9·32	22	12·84	15	5·64	204	86·60	
10·70	20	13·03	17	12·03	14	9·53	20	11·12	13	4·95	185	79·51	
12·89	21	12·65	19	14·79	14	10·35	23	11·61	17	6·12	202	90·87	
9·93	19	9·83	15	13·99	11	6·34	19	9·64	14	4·64	173	69·07	
10·88	16	8·38	13	11·32	17	6·15	17	6·91	8	4·92	156	60·12	
10·38	18	8·86	18	16·14	16	11·33	17	8·86	11	5·07	160	75·88	
10·11	18	8·52	13	11·57	15	8·80	16	8·84	8	5·18	143	65·44	
10·98	23	10·46	17	9·99	17	8·71	23	11·33	15	5.51	213	75·30	
9·89	18	11·32	15	11·54	11	6·70	18	8·28	9	3·96	159	70·50	
10·20	20	9·97	16	9·58	15	5·59	20	8·70	12	5·01	170	61·93	
171·65	338	186·14	286	210·95	259	134·76	356	189·62	220	79·53	3·139	1·256·62	
9·54	19	10·34	16	11·72	14	7·49	20	10·53	12	4·42	174	69·81	